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AN INCREASE of nearly one-third is shown in the December returns of gold production in the Transvaal, owing to the increased number of mines now at work. The total for the month was 52,897 ounces, making the production for the eight months of 1901, during which operations were permitted, 238,991 ounces fine gold, or $4,939,944. In 1900, when some of the mines were operated for part of the year by the Government of the South African Republic, the output was $7,208,869. In 1899, when the war stopped gold mining in October, the total was $72,961,501, and in 1898 the production was $78,070,761. There is little doubt that the production would have passed $100,000,000 last year had it not been for the war.

⚒

MINERAL OILS, crude and refined, take an important place in the export trade of the United States. The total value of the mineral oils exported from this country in 1901 amounted to $72,784,866. Most of this consisted of refined products. The recent developments of oil producing territory in California and Texas will undoubtedly swell the export business in crude oil to be used for fuel purposes. In the interest of this new industry we give a considerable space in this issue to the results of tests of Beaumont, Texas, fuel oil which were made in this city under the supervision of Prof. James E. Denton, of the Stevens Institute. The recent application of crude petroleum to the manufacture of open-hearth steel as reported from Germany is also of considerable interest.

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THE STATEMENT of the export trade in mineral products from the port of New York, which is given on another page, shows that there was quite a substantial increase in December as compared with the preceding month. The total value of the exports increased 24 per cent from $6,245,607 in November to $7,764,386 in December. Copper exports contributed nearly one-half of this increase, or $749,721. As compared with November, the exports of copper in the closing month of the year increased 67 per cent in amount and 58 per cent in value. Increases were also shown in nearly all lines of iron and steel manufactures. The value of mineral oils exported in December exceeded November's record by about $750,000.

⚒

AN INTERESTING description of the mining methods employed in the construction of the New York subway is given in this week's issue. It is exceedingly unfortunate that a postscript to this article has had to be written, recording as it does a disastrous explosion of dynamite which had been stored, evidently in considerable quantity, near the north end of the Fourth Avenue section. Six lives were lost, a hundred or more people were injured and an enormous damage to property was sustained.

The responsibility for the accident has not been fixed at the time this paper goes to press, but there seems to be little doubt that even ordinary precautions had been neglected. That a sufficient quantity of high explosives should have been kept practically unprotected in the midst of a thickly populated neighborhood, where the streets are alive with traffic at nearly all hours of the day and night, appears incredible. Under the circumstances it is only surprising that the loss of life was as small as it was. The lesson, however, has been a severe one, and it is probable that steps which will prevent a similar accident elsewhere will be taken by the authorities. It is to be deplored that the careless handling of dynamite and other dangerous agents is rather frequent in mining operations, and it is a part of the "methods" which should find no place, nor is there any excuse to be offered for it, under such conditions as obtain in the subway work.

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THE GENERAL impression that British Columbia mines have not been doing well recently seems to be contradicted by the statements just issued by Mr. W. T. Robertson, the Provincial metallurgist, giving a close estimate of the output of the Province for the year 1901. Comparing this with the completed figures for 1900 we find that the total mineral production of the Province reached a value of $20,713,500, showing an increase of no less than 26.7 per cent over the previous year. The various items which go to make up this total nearly all show a gain substantial in its amount. There was, it is true, a falling off in gold from placers, due partly to a short season and partly to the failure of the large hydraulic operations undertaken in the Atlin and in the Cassiar to yield any considerable amount during the first season; but there was a large increase in the gold produced from the lode mines, and the gold production reached a total last year of $5,596,700, an increase of 18.3 per cent over 1900. Silver also showed the considerable gain of 13.6 per cent, while the production of copper reached the total of 30,736,798 lbs., or, 206.6 per cent more than in the previous year. A large part of this gain was due to the Granby and Grand Forks smelters, and to the production of ores from the mines of the West Kootenay division. Lead showed a falling off which amounted to 26.8 per cent, and this was due not so much to the failure of mines as to the refusal of smelters to buy Canadian lead ores and their determination to curtail production in view of the very large stocks which had been carried over from 1900.

The total production of metals in the Province showed an increase of 33.4 per cent in values, which goes far to reverse the popular impression as to the course of British Columbia mining during the year. In non-metallic substances the principal values were in coal and coke. Both of these showed substantial gains which were the result mainly of the opening of the Crow's Nest mines. In view of the fact that there was a considerable decrease in the export of British Columbia coal to California, the gain in coal and coke production is very encouraging, showing that there has been a much better demand at home, chiefly from the mining and smelting industries. The remaining products, which include building stone, cement, clay and similar matters, showed a fair increase. Upon the whole, Mr. Robertson's report must be considered a very encouraging one to British Columbia miners.

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MINING ACCIDENTS IN GREAT BRITAIN.

We have received an advance copy of the preliminary report of the inspectors of mines of Great Britain, giving the number of accidents and of lives lost during the year 1901. The figures for the different classes of mines are as follows:

	1900. Accidents.	1900. Deaths.	1901. Accidents.	1901. Deaths.
Coal Mines	962	1,095	949	1,012
Metal mines	37	38	28	31
Quarries	124	127	96	97
Totals	1,123	1,260	1,073	1,140

The mines worked under the terms of the Coal Mine Act showed a small decrease in the number of accidents, but an increase of 8 per cent in the number of persons killed. In the operations under the Metal Mines Act there was a decrease both in the number of accidents and in the number killed. There was also a decrease in both accidents and fatalities in the workings controlled by the Quarries Act, which include some iron ore mines as well as stone quarries. In the total there was a decrease of 50 in the number of accidents and of 120 in the fatalities.

The causes given for these accidents may be summed up as follows:

	Coal. mines.	Metal. mines.	Quarries.	Total.
Fire damp or coal dust explosion	21	..	..	21
Falls of rock, etc	461	12	39	512
Shafts and hoisting	66	5	3	74
Explosives	17	5	13	35
Haulage ways	187	..	5	192
Other causes	49	3	24	76
Total underground	801	25	84	910
Surface accidents	148	3	12	163
Totals	949	28	96	1,073

Explosions of firedamp and coal dust were the class of accidents causing the largest number of fatalities to each case, 125 deaths having resulted from the 21 accidents, an average of nearly 6 to each. By far the most frequent cause of accidents, however, was found in falls of rock, 512 accidents—47.7 per cent of the total—being given from this cause; and though most of them caused only a single fatality, there were 531 deaths in these accidents. The next cause given in numbers was in the haulage ways, which includes run-overs by tram cars, breakage of ropes and the like. Shaft and hoisting accidents were third in order, though a long way behind the others.

Upon the whole the statement is a favorable one, showing a substantial decrease in the number of fatalities. This is in the line of recent progress in British mining and mine regulation. At the same time it seems as if some steps could be taken to lessen the risk of falls of rock and coal; though they seem to be the leading cause of accident wherever mining operations are carried on.

⚒

COPPER CONSUMPTION IN EUROPE.

The diminished consumption of copper in Europe in 1901 had a very important effect on the copper market for the year, as has been heretofore noted. The following table, the figures for which are furnished by the circular of Messrs. Henry R. Merton & Company, of London, show approximately the consumption of copper in Great Britain and on the Continent of Europe for the year and the sources from which the supplies were drawn. The figures are in long tons, of 2,240 pounds:

	1900.	1901.	Changes.
Stocks January 1	22,817	28,860	I. 6,043
Receipts from:			
North America	161,209	94,670	D. 66,539
Spain and Portugal	26,749	24,134	D. 2,615
Other countries	45,919	53,267	I. 7,348
Chile	25,700	30,650	I. 4,950
Australia	20,800	25,200	I. 4,400
Total supplies	280,377	227,921	D. 52,456
Total	303,194	256,781	D. 46,413
Deliveries for consumption	269,635	227,533	D. 42,102
Shipment of standard to U. S.	4,699	7,197	I. 2,498
Total	274,334	234,730	D. 39,604
Stocks December 31	28,860	22,051	D. 6,809

The total falling off in consumption, as shown by this statement, was 15.6 per cent, which was due to the depressed condition of trade and the very general suspension of work on new electrical enterprises. These conditions have been so fully treated heretofore that they require no comment here. The important point is that all the decrease—and a good deal more—came out of the purchases of American copper. The relatively high price of copper in 1900 and the earlier part of 1901 stimulated production in Chile and Peru, in Australia, and in other countries, among which Japan is prominent. In 1901 Europe took some 16,700 tons more from those producers than in 1900; and this quantity was deducted from its purchases of American metal, as well as the quantity representing the actual decrease in consumption. European consumers not only bought where they could secure metal a little cheaper; they were also influenced in some degree by a wish to break the apparently inflexible price maintained here, and the natural desire to maintain in some degree the control of the market.

To get at the complete fall in the quantity taken from this country, we have to add to the actual drop in imports the increase in the quantity of standard copper shipped from London to America. This gives a total of approximately 69,000 tons, or 44 per cent, a change unprecedented in a single year. Even the extraordinary consumption in this country failed to make up for so great a deficit in the demand as was thus created.

These figures throw some light on the situation, and they also suggest very strong doubts as to the wisdom of the policy adopted by the chief producer and seller in maintaining a forced price so long. It has not resulted to the benefit of American producers so far.

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PIG IRON PRODUCTION IN 1901.

The American Iron and Steel Association has completed the collection of statistics from the blast furnaces, and reports the total output of pig iron in the United States for the year 1901. These corrected figures show that the approximation made in the Journal for January 4 last was very close to the actual production. The totals reported by the Association for the years 1900 and 1901 are as follows, in long tons:

	1900.	1901.	Changes.
First half year	7,642,569	7,674,613	I. 32,044
Second	6,146,673	8,203,741	I. 2,057,068
Totals	13,789,242	15,878,354	I. 2,089,112

The falling off in the second half of 1900 found no parallel in 1901. The output of the blast furnaces for the second half of last year exceeded that of the first half by 529,128 tons, and the gain for the whole year over 1900 was 15.2 per cent. The actual gain was much greater than that shown in the boom year 1899 as compared with 1898. The production for the second half of the year was very nearly equal to that for the entire year 1896; and was about the same as the output of Great Britain for the complete year 1901.

The production as classified by uses was as follows:

	1900.	1901.	Changes.
Foundry and forge	4,517,437	4,541,250	I. 23,813
Bessemer pig	7,943,452	9,596,793	I. 1,653,341
Basic pig	1,072,376	1,448,850	I. 376,474
Spiegeleisen and ferromanganese	255,977	291,461	I. 35,484
Totals	13,789,242	15,878,354	I. 2,089,112

The increase in 1901 was almost wholly in pig iron intended for conversion into steel. The following table shows the proportion of each class of iron to the total for the two years:

	1900.	1901.	Changes.
Foundry and forge irons	32.8	28.6	D. 4.2
Bessemer pig	57.6	60.4	I. 2.8
Basic pig	7.8	9.1	I. 1.3
Spiegeleisen and ferromanganese	1.8	1.9	I. 0.1
Totals	100.0	100.0	...

The highest proportional gain last year, as compared with 1900, was in basic pig, 35.1 per cent; showing the steady gain which the basic open-hearth process of steel manufacture is making in this country. Bessemer pig gained 20.8 per cent. Foundry and forge pig iron were nearly stationary; these two classes are reported together, and it is probable that there was a decrease in forge iron, as the demand for foundry iron was good throughout the year.

The division by fuel used was as follows for the two years:

	1900.	1901.	Changes.
Coal and coke	13,404,760	15,494,913	I. 2,090,153
Charcoal	384,482	383,441	D. 1,041
Total	13,789,242	15,878,354	I. 2,089,112

The iron classed as charcoal iron in 1901 included 360,147 tons made with charcoal only, and 23,294 tons made with mixed charcoal and coke.

The number of furnaces in blast at the close of 1900 was 232; on June 30, 1901, there were 259 active, while on December 31 there were 266 in blast. The average output per furnace in 1901 was about 61,100 tons, which compares with 59,950 in 1900.

Consumption followed production very closely, for the total unsold stocks reported at the close of the year were only 73,647 tons, or less than two days' average production. The stocks reported at the opening of the year were 442,370 tons.

The showing which our blast furnaces made last year was certainly a wonderful one, and there is every prospect that the opening year will see equally good work.

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MARKET CONDITIONS.

The copper market is slightly improved, purchases having been made more freely and consumers apparently thinking it is better to come into the market now than to wait longer. An improvement in prices is noted and the present appearances are that it will continue. Some comment on one phase of the copper market will be found in another column. Reports have been current that a syndicate has been formed to take a large amount of copper from the Amalgamated Company; it is impossible to ascertain the truth of these rumors, but they seem to have a possible basis of truth.

In other metals there is little change to note. The demand continues fair for lead, and there is no change in prices. For spelter also, there is a good demand with little change. Quicksilver seems to be somewhat weaker, although the demand continues fully up to the production.

The iron market continues practically unchanged, the conditions of strong demand and production under high pressure being reported from almost all quarters. The output of raw iron has improved somewhat since the first of the month. The railroad transportation continues to show an improvement, so that ores and fuel are being delivered to furnaces with much less delay. At the same time, also, finished material is shipped with more promptness and the congestion which existed in a good many yards has been somewhat relieved. Most furnaces have their full capacity engaged for the first half of the year, while a number have contracts running into the third and even the fourth quarter. This is not only the case in the Central West, but the Alabama iron men also report that they will have little iron to spare before July, while several furnaces have their surplus engaged for considerably beyond that. This is especially the case with those making bessemer and basic pig, although the foundry and forge iron capacity is also pretty well taken up. The only special incident during the past week has been the meeting of the bar iron people, at which it

was expected that an increase in prices would be agreed upon. After considerable discussion, however, it was decided to make no change, but to keep the price of bessemer steel bars firm at 1.50 cents, Pittsburg, as a basis. Here again the influence of the large producers was seen, and it is another evidence that they are opposed to any sharp increase in prices which the situation might seem to favor. Doubtless this policy will prove far the best in the end. The greatest pressure at the present time is for structural material, as might be expected with the approach of the active building season.

The report of the United States Steel Corporation, which appeared this week, is given on another page. Its full and frank statements show that the company is determined to adhere to the excellent policy of publicity as to its operations. This is in marked contrast to the persistent secrecy of another prominent corporation; and the present condition of the trades in which the two companies are respectively concerned is a comment on the results of the two policies.

In the Western coal trade the situation is improving slightly with better railroad transportation, although shipments have been to some extent delayed by stormy weather.

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MINING DIVIDENDS.

January has not shown as large a dividend disbursement as was recorded a year ago. Usually January is a big month, but this year some of the regulars cut their annual rates. Nevertheless there were four new and two extra dividend payers in the total of 63 companies reporting to the ENGINEERING AND MINING JOURNAL in January. In all $7,751,273 was paid, of which $4,989,498, or 64 per cent was reported by 37 metal mines and smelting and refining companies, and the balance of $2,761,775 or 36 per cent, by allied concerns.

Foremost in the metal mines list are three copper companies, with $2,653,804 to their credit. In this group Amalgamated of Montana has cut its quarterly rate to 1 per cent by dropping the extra ½ per cent, which means a total reduction of $769,240 since October. Parrot, under Amalgamated control, has likewise reduced its quarterly payment from $1 per share to 50 cents, being $114,925 less than October, and $229,850 less than January, 1901. The Calumet & Hecla, of Michigan, has lowered its quarterly dividend from $15 per share in October to $10 in January, a reduction of $500,000. Thirty gold, silver and lead mining companies, located chiefly in Colorado, Utah and South Dakota, paid a total of $2,148,195. Of this amount the American Smelting and Refining Company—the smelter trust—paid $875,000 on its preferred stock, being a quarterly dividend of 1¾ per cent. An inital quarterly dividend of 1 per cent ($60,000) was paid on the preferred stock of the United States Reduction and Refining Company, of Colorado, the consolidation of Cripple Creek metallurgical plants. The biggest payer in the gold mines was Stratton's Independence, of Cripple Creek, Colo., which is largely controlled in London; the amount was $240,001, being a quarterly rate of 5 per cent on the issued capital. Vindicator Consolidated, also in the Cripple Creek District, and controlled principally by Colorado people, has increased its quarterly rate of 3 per cent, by paying an extra of 5 per cent, meaning an additional disbursement of $55,000, and making a total of $88,000. Yankee Consolidated, in the Tintic District, Utah, announced its first dividend of 5 cents per share, or $25,000. The Empire State Idaho Company, which has been accustomed to pay 1 per cent monthly, has reduced the rate to ½ per cent, equal to $25,277. Three California quicksilver properties paid $170,000. Of this amount $150,000 was the first quarterly payment on the $5,000,000 capital stock of the Empire Consolidated Quicksilver Mining Company, which was incorporated last year by eastern parties to operate three mines in Lake and Colusa counties. The United Zinc Company, of Missouri, besides paying its regular quarterly dividend of 2 per cent on the issued preferred stock, has begun quarterly payments of 1 per cent on the common shares.

In the industrial list five coal and coke properties met declarations of $1,389,665. The heaviest payers were the Pittsburg, Pa., combinations—the Monongahela River Consolidated Coal and Coke Company, and the Pittsburg Coal Company—the former paying 3 per cent semi-annually ($347,165), and the latter, 1¾ per cent quarterly ($560,000) on their respective preferred stocks. Six iron and steel companies paid $602,971. These were led by the Republic Iron and Steel Company, with $355,371 or 1¾ per cent on the preferred stock issued. A new comer is Temple Iron, of Pennsylvania. Ten petroleum and natural gas concerns distributed $392,639, of which $221,282 came from a Pennsylvania natural gas company, being a quarterly dividend of 75 cents per share on its common stock. The balance of $171,357 was contributed by 9 California oil companies. Five cement and chemical companies paid $376,500. Of this total the Southern fertilizer combination, the Virginia-Carolina Chemical Company furnished $240,000, which was the usual quarterly dividend of 2 per cent on the preferred stock. The new Federal Chemical Company, a large Southern fertilizer manufacturer, began quarterly payments of 1½ per cent ($22,500) on its preferred stock.

In addition to the above United States dividends, there were paid during the month $105,936 by six Mexican precious metal mines, $15,000 by one in Central America, $2,500 by two in British Columbia, and $120,000 by one coal property in Nova Scotia; making a total of $263,436 reported by 10 foreign properties. The bulk of this was due on regular declarations.

Though the dividends reported in January are large, the total would be materially increased were it possible to give the disbursements of the many private and close corporations, which do not report.

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REDUCED WAGES IN BRITISH METAL TRADES.

CONSULAR REPORT.

In the iron and steel trades in Scotland and the north of England, production in 1901 has fallen off considerably, as compared with 1900. Reliable statistics of production during 1901 are not yet available, but it is estimated by well-informed men in the trade that the output of pig iron is 10 per cent below last year's figures; of manufactured iron in all forms, 35 per cent, and of steel, about 10 per cent. The continued prosperity of the shipbuilding industry has alone saved the steel trade from a far more serious decline in point of production; but even the increased demand from the shipbuilders has not, despite the diminished output of steel, checked the shrinkage in prices. Steel plates have fallen from $32.45 per ton in December last to $28.45 at the present time; manufactured iron, from $40.10 per ton to $31.65. Perhaps the most noteworthy result of the unfavorable conditions that have obtained in the iron and steel trades is the general reduction of wages, blast-furnace men having lost as much as 29 per cent, steel-plate makers and smelters 20 per cent, iron workers 17 per cent, and iron ore miners 29 per cent.

THE FOREIGN IRON AND STEEL TRADE OF UNITED STATES.

Exports of iron and steel—including machinery—from the United States in the year 1901 were valued by the Bureau of Statistics of the Treasury Department at $102,539,797, against $129,633,480 in 1900 and $105,690,647 in 1899. The falling off in 1901 was chiefly in raw iron and steel, machinery showing comparatively little change. The decrease is fully explained by our own enormous consumption, which left little surplus for sale abroad, and by the condition of the iron trade in Europe, where there was little demand for our material. German and British makers, in fact, were compelled to curtail their production in consequence of the falling off in consumption, so that there was little opportunity to place American iron. In fact, toward the close of the year, some mills in this country bought German steel billets, being unable to secure all they required here.

The chief items of iron and steel exports are given in the table below, in long tons:

	1900.	1901.	Changes.
Pig iron	286,687	81,178	D. 205,509
Billets and blooms	107,385	28,614	D. 78,771
Bars	139,308	45,004	D. 94,304
Rails	356,245	318,055	D. 38,190
Plates	54,865	30,828	D. 24,037
Structural steel	67,714	54,005	D. 13,709
Wire	78,014	88,237	I. 10,223
Nails	37,563	28,075	D. 9,488

Of the steel rails exported in 1901 the chief items were 65,797 tons to Canada; 54,221 to Asia and Oceanica; 53,456 tons to Mexico; 52,569 tons to South America; 37,888 tons to Europe; 17,364 tons to Japan; 16,364 tons to Africa, and 15,350 tons to the West Indies.

It will be noted that wire was the only item in the table which showed an increase in 1901.

Imports of iron ore into the United States for the year ending December 31, 1901, were 966,950 long tons, against 879,831 tons in 1900; showing an increase of 87,119 tons. The larger part of these imports were from Cuba.

Exports of iron ore from the United States for the year 1901 were 64,703 tons, against 51,460 tons in 1900. These exports were largely to Canada.

THE BRITISH IRON TRADE IN 1901.

As we have already intimated, the course of the British iron trade in 1901 was almost the reverse of our own. In our issue for January 4 we showed the large increase in production and consumption of iron and steel in the United States and the generally higher range of prices which characterized the markets at the close of the year. It has been often the case that the iron markets of this country and Great Britain ran on nearly parallel lines, but the year recently closed shows a marked variation.

In 1899 the British production of pig iron ran up to 9,305,500 tons, the highest figure reached in recent years. In 1900 there was a decrease of nearly 400,000 tons, the output falling to 8,908,500 tons. In 1901, while the exact figures have not yet been obtained, a high authority estimates the production at 8,200,000 tons; a decrease of 700,000 tons from the preceding year, and of 1,100,000 tons from 1899. Notwithstanding this falling off in output there was an increase in stocks on hand at the close of the year of about 65,000 tons. It must be noted, however, that the consumption in Great Britain showed apparently little change, this increase in stocks and the decrease in exports—chiefly to the European Continent—accounting for all the decreased production. The falling off in exports was due to the depression in Germany and Russia. In 1900 a good deal of British pig iron went to Germany, while in the later months of last year conditions were reversed and German pig was pressed for sale in the English markets.

If we pass from production to prices, we find that there was a considerable fall during the year 1901. There are three leading grades of pig iron in the

British market—Scotch pig, Cleveland pig and hematite or bessemer iron. These are largely sold by warrants, and are subject to more purely speculative fluctuations than are found here, Scotch pig warrants being especially liable to such changes. This was the case last year, though the speculation was somewhat less active than is sometimes the case. Scotch pig at the opening of 1901 sold at about $14.50 per ton; by July it had fallen to $12, and though later it was put up to $13.50 the rise lasted but a short time, and at the close of the year it sold about $11.50. This is a drop of 40 per cent from the early part of 1900, when Scotch warrants brought from $18.50 to $19 per ton.

Similarly, Cleveland iron fell during 1901 from $12 to $10.25 per ton; while hematite iron dropped from $15.25 to $13.25. It will be seen that all these grades are now selling considerably below our own level of prices.

In finished material there was also a marked reduction, iron and steel bars dropping during the year about $6 a ton, sheets $5, steel rails and ship plates—which showed the least reduction—about $2.50.

The present position of the trade is shown by the fact that at the close of 1901 there was a reduction of 55 in the number of blast furnaces active, as compared with the opening of the year. At the same time the trade appears to be in a comparatively sound condition, and there has been less financial trouble than might have been anticipated from so sharp a reaction as was witnessed last year. Compared with the German trade the British iron-makers may be called prosperous, though they are so much less busy than our own.

EXPLOSION OF DYNAMITE IN THE NEW YORK SUBWAY.

Most of the readers of the ENGINEERING AND MINING JOURNAL have read in the daily press reports something of the explosion of dynamite which occurred in the Rapid Transit tunnel at Forty-first Street and Fourth Avenue, New York City, January 27. In another column of this issue is given an account of the engineering problems involved in constructing the subway, and of the methods employed in driving headings, maintaining the right of way for carriages and electric cars on the streets, and keeping in place the network of sewers, gas pipes, conduits, etc., beneath the surface.

To permit the utmost speed in construction, the whole length of the subway was divided into sections let out to various sub-contractors. The difficulties presented by the Fourth Avenue and Forty-Second Street sections were unusually great. Much of the work is through solid rock on Park Avenue, and on Forty-second Street there were more than the usual number of pipes and conduits to be moved or kept in place. To facilitate work a shaft more than 50 feet deep was sunk near Forty-first Street and Park Avenue, and a tunnel was being driven South from this shaft. The sub-contractor, like all the others along the tunnel, used dynamite for blasting. The city ordinances regarding the use of explosives require that only a sufficient amount for twelve hours' work shall be kept in storage at the point where it is to be used. Whether or not this ordinance was violated is still uncertain, but the indications are that it was. In fact, according to the statement of some employees, there were stored in a little frame shanty near the mouth of the Forty-first street shaft between 300 and 500 pounds of dynamite.

One of the employes used a lighted candle in the shanty. He left it on a shelf for a moment and on returning found that it had fallen to the floor and set fire to a lot of loose paper. There were no means of extinguishing the fire at hand, and, realizing that an explosion was imminent, he rushed away warning all persons that he saw. The explosion followed in a few moments, utterly wrecking the derrick, rigging and other working machinery about the top of the shaft, and doing an enormous amount of damage to adjacent property. The effect of the explosion at the shaft is shown in the accompanying illustration, which is obtained from a photograph taken by the artist for the *New York Herald*.

Had the explosion taken place in the tunnel 40 feet below ground, the damage to the tunnel would undoubtedly have been greater, but the property loss less. Taking place in the open air, the explosion was felt most by the buildings in the immediate vicinity. The Murray Hill Hotel, a very large modern building, directly in front of the shanty, got the full force of the explosion. Debris of all kinds was blown through the windows, ceilings were wrecked, and furniture destroyed. The Manhattan Eye and Ear Infirmary, on the opposite side of the street, also suffered severely, as did the Grand Union hotel, and the New York Central station, while glass was broken in many buildings within a radius of half a mile. Six persons were killed, while a large number were wounded by flying debris and broken glass.

Explosions of a similar character are not uncommon in mining camps, as miners are proverbially given to taking liberties with dynamite. What made the explosion in this case a terrible disaster was that it took place in the heart of a great city in a location near several large hotels where many thousands of people are passing daily.

SHAFT OF NEW YORK SUBWAY AFTER THE EXPLOSION. (*Courtesy of the New York Herald*).

It is as yet impossible to place definitely the responsibility for the accident, but it is quite evident, if the various accounts of employees are to be trusted, that there was gross negligence somewhere. So large an amount of dynamite should not have been stored in such a location and in such a building. Only enough for the day's use should have been kept near the shaft, and that should have been in a chamber in the wall of the tunnel far below the surface. Such precautions would have reduced the damage to surrounding property and possibly have saved human life. That more lives were not lost is due to the fact that the explosion occurred during the noon hour when the workmen were away from the shaft and tunnel.

EXPORTS FROM NEW YORK.

Below we give a table of the exports of mineral products and their manufactures from New York in December and the year 1901. Our best customers in these lines have been Great Britain, Germany, France and Italy. There is no doubt that trade with these and neighboring countries can be materially increased. During the past year we had to contend with the industrial depression abroad, especially in Germany, which was severely felt in our exports of the important products, notably copper.

It is, however, encouraging to note that the year 1902 began well, and that the low freight market has enabled exporters to charter vessel room some time ahead. Moreover, if current rumors of a proposed steamship consolidation prove true, our export trade must be greatly benefitted thereby, as the promoters of the scheme are understood to be closely identified with the steel industry.

Articles:	Year—Quantity.	Value.	December—Quantity.	Value.
Coal, anthracite, tons	2,873	$13,390	93,351	$390,535
Coal, bituminous, tons	3,495	12,717	58,294	187,558
Copper, ore, tons	1,757	222,870	13,700	2,070,328
Copper ingots, etc., lbs	12,672,857	2,036,807	133,570,050	28,296,567
Copper, manufactures	.....	56,241	.....	872,769
Copper, sulphate, lbs	206,157	8,296	37,562,385	1,767,087
Iron, pig, tons	1,373	25,691	11,861	216,466
Iron, scrap, tons	40	628	1,578	29,202
Iron hoops, bands, lbs	141,913	2,899	2,066,371	44,633
Iron and steel bars, rods, lbs	1,306,150	26,173	53,380,286	1,021,981
Iron and steel billets, ingots, lbs	.....	.....	5,060	143,227
Iron and steel sheets, lbs	510,077	14,565	28,765,460	537,524
Iron, structural, lbs	3,142	237,824	35,430	2,980,083
Iron and steel wire, lbs	18,174,370	375,857	143,051,484	3,336,586
Iron and steel manufactures	.....	351,136	.....	4,318,220
Iron and steel nails, lbs	4,037,882	78,644	43,378,924	946,296
Lead, pigs, etc., lbs	17,383	673	65,870	3,219
Lead manufactures	.....	11,834	.....	125,974
Mineral oils, gals	57,227,554	4,043,469	604,105,289	44,848,808
Nickel, lbs	327,818	91,424	5,663,961	1,519,774
Roofing slate	3,033	75,000	24,092	694,995
Steel rails, tons	298,001	13,227	3,887,740	159,832
Zinc ore, tons	.....	1,915	.....	14,431
Zinc, pigs, lbs	802	25,248	106,840	2,988,369
Zinc manufacture	.....	37,858	.....	406,099
Total values	.....	$7,764,386	.....	$97,020,563

The total value of the exports of mineral products in November, 1901, amounted to $6,245,607 compared with which the exports in December show an increase of $1,518,779 or 24 per cent. An encouraging fact connected with this statement is that about half of the increase in December was due to larger foreign shipments of copper in ingots, bars, etc. The exports in this line increased from 7,573,550 pounds, valued at $1,287,086 in November to 12,672,857 pounds, worth $2,036,807, showing a gain of 5,099,307 pounds or 67 per cent in amount, and of $749,721 or 58 per cent in value.

The exports of mineral oils increased from 43,714,924 gallons in November to 57,227,554 gallons in December, the value increasing from $3,280,920 to $4,043,469. Increases were also shown in all kinds of iron and steel products with the exception of scrap iron and iron and steel sheets. Decreases were shown in the exports of both anthracite and bituminous coal, but neither of these have any important bearing on the totals.

SULPHATE OF COPPER EXPORTS FROM GREAT BRITAIN.—For the full year 1901 the exports of copper sulphate from Great Britain were 36,016 long tons, against 42,900 tons in 1900; showing a decrease of 6,884 tons, or 16 per cent, last year.

THE AMERICAN INSTITUTE OF MINING ENGINEERS.

The following circular has been issued from the secretary's office, under date of January 18, 1902:

"I. As already announced in Circular No. 6 of 1901, the eighty-second meeting of the Institute (being the thirty-second annual meeting) will be a purely formal session, held in the office of the secretary, 99 John street, New York, on February 18, 1902, at noon, for the purpose of counting of ballots and the presentation of the annual report of the Council, which will be subsequently printed and distributed, as usual. The titles of all papers accepted will also be presented, and these papers will be printed and distributed for discussion at an adjourned meeting bearing the same number, to be held, probably, at Philadelphia during May or June. Particulars will be announced later.

"II. According to the terms of Paragraph 4, Circular No. 6, 1901, the subscription price for the new 'Genesis of Ore Deposits' will hereafter be $6, which includes free delivery. This volume of 825 pages will be bound in book linen, in style and color corresponding with the annual volumes. If it is desired in half morocco, $1 additional, or $7 in all, should be forwarded with the order.

"III. The volume on 'The Evolution of Mine Surveying Instruments,' comprising about 400 pages, issued in the same style as the foregoing, will contain the original paper of Mr. Dunbar D. Scott on that subject (*Transactions*, XXVIII), first published in 1898, together with later papers, continuing the same subject, and discussions thereof, by Hoskold, Lyman, Davis and many others. Subscriptions will be received for this volume in advance of its issue at $3, under the conditions as to binding, already stated above. It is expected to be ready during February. After February 15, the price of this volume will be increased to $4 in cloth or $5 in half morocco.

"IV. In view of the greatly increased size of the *Transactions* the Council has decided to increase the price of extra copies of the volumes, commencing with Volume XXX, to $6 in paper covers, or $7 in half morocco."

A PERMANENT EXPOSITION IN MEXICO.

United States Consul W. W. Canada writes from Vera Cruz that the project of establishing a permanent exhibition of foreign and native products in the City of Mexico, which has been under consideration for some time, is likely soon to be an established fact.

A contract has been signed between the Department of Public Improvement, on the part of the Mexican Government, and Mr. Jose Landero Cos, representing a company, by which a concession is granted to the latter to establish a permanent exhibition as above mentioned. The agreement has already been approved by the lower house of Congress, and it is hoped it will meet the approval of the Senate.

According to this agreement, the buildings for the exhibition shall be finished within three years, and cost not less than $300,000 in Mexican currency. The concession is for a term of 10 years.

The administration of the exhibition will promulgate its rules and regulations, approved by the Government, in Spanish, English, French, Italian and German. An annual catalogue will also be published in the same languages, containing a descriptive list of all the articles exhibited. Any article to be received for exhibition must be accompanied by a ticket, stating the name of the manufacturer or producer, or his agent, the name of the article, its application, price, and all other necessary data. Enough space in each building shall be reserved for Federal Government exhibits.

In order to assure the success of the exhibition, the Government of the Republic asks the different States of the Federation to obtain articles and data, and such other information as will help to extend commercial relations.

All material necessary for the construction of the buildings, as well as samples of foreign products, will be admitted free of duty, under a bond guaranteeing that they are for the use of the exhibition only. However, any samples so imported which have not been sold or re-exported within one year will be assessed the usual duties, according to the tariff in force at the time of importation.

COAL AND COKE SHIPMENTS.

With the gradual improvement in the car supply, and the resumption of active work at the flooded Pennsylvania collieries, coal shipments are assuming their old-time regularity.

Anthracite.—Some of the leading mines in Pennsylvania that suffered severely from the recent floods, are again producing and shipping to tidewater. The Pennsylvania Railroad moved in the 3 weeks ending January 18, a total of 208,139 short tons, which is 53,567 tons less than last year.

Bituminous.—The good demand from the Atlantic seaboard has resulted in active shipments from the various coal producing centers. In the first two weeks of January the movement from the Beech Creek Region in Pennsylvania aggregated 205,019 short tons, which is an increase of 16,017 tons as compared with last year. In the whole year 1901, the Beech Creek Region reported 4,886,046 tons. The Broad Top District in Pennsylvania also showed increased shipments, reporting in the four weeks ending January 25, a total of 63,838 tons, against 45,247 tons last year. Cumberland shipments over the Huntingdon & Broad Top Railroad in the same four weeks were 88,279 tons, against 135,303 tons last year; a decrease of 47,024 tons. The Pocahontas movement in the two weeks ending January 11, was 226,161 tons showing an increase of 23,834 tons as compared with last year. The total shipments over the Pennsylvania Railroad for the three weeks ending January 18 were 1,172,065 short tons; a decrease of 47,795 tons from 1891.

Coke.—Production has grown with the release of railroad cars. In the first three weeks of January, the shipments from the Connellsville Region, in Pennsylvania, as reported by the *Connellsville Courier*, amounted to 29,686 cars, as against 27,079 cars last year; an increase of 2,607 cars. The shipments from the Beech Creek Region in the 2 weeks ending January 14 were 6,339 tons, against 5,224 tons last year. In the whole of 1901 the movement from Beech Creek aggregated 162,231 tons.

LARGE COAL CARS IN GREAT BRITAIN.—The Caledonian Railway has given notice to shippers that it is about to put in service some coal cars of a larger size than have heretofore been used, and asks coal shippers and coalmasters to co-operate with the company in encouraging their use. The outside dimensions of the cars are: Length, 39 feet 9 inches over buffers; height from rail, 8 feet 2 inches. Their capacity is 30 tons of coal each.

UNITED STATES STEEL CORPORATION.

The United States Steel Corporation on January 29 issued a report to stockholders giving a full account of its business from the date of organization in April up to December 31. The report is issued in advance of the annual meeting, which will be held February 17.

The net earnings shown in the report are the same as those which were recently published. For the nine months the net earnings (December figures estimated) were:

Net earnings		$84,779,208
Sinking and reserve funds	$11,958,994	
Interest on bonds, 9 months	11,400,000	
Dividend on pref., 5¼ per cent	26,752,894	
Dividend on common, 3 per cent	15,227,812	
Outstanding stocks subsidized companies	25,101	
		65,364,801
Balance applicable to additions to surplus, new construction, etc.		$19,414,497

The balance sheet as of November 30 (it being found impracticable to present figures for a later date) shows:

Assets:		
Cost of properties		$1,437,494,862
*Deferred charges to profit and loss		3,256,774
Investments		429,613
Current assets—		
Inventories	$95,603,098	
Securities of outside companies	7,251,329	
Accounts—		
Receivable	$45,269,453.19	
Bills receivable	2,821,463.55	
	$48,090,916.74	
Cash	55,315,527.90	
	103,406,445	
		206.261,772
Total		$1,647,443,021

*Expenditures for improvements, explorations, stripping and development at mines, and for advanced mining royalties, which are to be charged to future operations of the properties.

Liabilities.		
Capital stock of U. S. Steel Corporation:		
Common	$508,212,544	
Preferred	510,173,778	
		$1,018,386,322
*Capital stocks of subsidiary companies not held by U. S. Steel Corporation:		
Common stocks	$365,436	
Preferred stocks	293,300	
Lake Superior Cons. Mines subsidiary companies	113,189	
		771,925
Bonded and Debenture debt:		
U. S. Steel Corp. bonds	$303,450,000	
Funded debt of subsidiary companies held by the public	59,349,839	
Debenture scrip	41,844	
		362,841,683
†Mortgages and purchase-money obligations:		
Mortgages	$3,457,037	
Purchase-money obligations	15,610,754	
		19,067,797
Current liabilities:		
Pay-rolls and accounts payable	$22,228,343	
†Bills and loans payable	12,653,744	
Special deposits due employes and others	5,435,342	
Accrued Interest, etc	4,870,410	
Common dividend No. 2, payable December 20, 1901	5,081,790	
		50,269,630
Contingent liability: Payment contingent upon retention of leases		525,399
Sinking funds and reserves for depreciation		21,236,041
Surplus of U. S. Steel Corporation and subsidiary companies		174,344,229
Total		$1,647,443,021

*Par value. †Of subsidiary companies.

"The outlook for the year 1902 is very bright. Everything indicates that all of the facilities of each subsidiary company will be taxed to their utmost to supply the demand that is being made. The actual business now booked, and of which shipment is being called for faster than it can be supplied, amounts to more than half the total combined annual capacity of all the companies. The heavier products, like rails, billets, plates and structural material, are sold up to the productive capacity of the mills until nearly the end of the year. In the more highly finished products the consumption in each case is greater now than at the corresponding period in 1901, which, it should be remembered, was an abnormally heavy year. The expectation, therefore, of those closely connected with the manufacture and sale of these highly finished products, is for a demand even larger than that of 1901 and up to the limit of production.

"*Policy as to Prices.*—The demand for the products of the several companies has been so great that prices could easily have been advanced. Indeed, higher prices have been voluntarily offered by consumers who were anxious for immediate execution of orders, but the companies have firmly maintained the position of not advancing prices, believing that the existing prices were sufficient to yield a fair return on capital and maintain the properties in satisfactory physical condition, and that the many collateral advantages to be gained in the long run by refusing to advance prices would be of substantial and lasting value, not only to the companies, but also to the general business interests of the country.

"The strong position thus taken by the companies for stability in prices both of raw material and finished products has had a reassuring effect on the trade, and has contributed greatly toward restoring confidence in the general business situation and creating the present large demand for steel products by dispelling any doubt as to prices in the future."

The report reviews at length the terms under which the stocks of subsidiary companies were acquired. Most of this information was made public when the company was organized, but no official statement was given at the time about the cost of the Carnegie Company. The report states that the underwriting syndicate which organized the company acquired 60 per cent ($96,000,000) of the stock of the Carnegie Company, and $159,450,000 face value of the 5 per cent bonds of the Carnegie Company by delivering to the holders thereof said $303,450,000 of bonds of the corporation and $1,200,000 in cash; and the syndicate acquired the remaining 40 per cent ($64,000,000) of the stock of the Carnegie Company by delivering to the holders thereof 982,771 shares of preferred stock and 902,790 shares of the common stock of the corporation.

It is stated that 92,500 shares each of common and preferred stock of the corporation were issued for the acquisition of an outstanding one-sixth interest in the Oliver Iron Mining Company and in the Pittsburg Steamship Company, thus securing the ownership of all of the stock of those two companies not owned by the Carnegie Company except directors' qualifying shares; and 20,045 shares of common stock and 17,910 shares of preferred stock of the corporation were issued for the acquisition of $8,018,200 of common stock and $4,776,100 shares of preferred stock, par values, of the Shelby Steel Tube Company under the contract above mentioned. The Aragon iron mines leasehold and the stock of the Bessemer Steamship Company have been purchased for cash paid and payable by the corporation or by some of the subsidiary companies.

The report further states that the residue of the common and preferred stock of the corporation delivered to the syndicate under the contract and not used for the acquisition by it of the stocks of the specified companies amounted to 649,987 shares of preferred stock and 649,988 shares of common stock. This residue of stock of the proceeds thereof, after reimbursing the syndicate the $25,000,000 in cash which it paid to the corporation, and approximately $3,000,000 for other syndicate obligations and expenses, constituted surplus or profit of the syndicate. The transactions between the corporation and the syndicate having been concluded, an agreement of final settlement and mutual release, dated January 3, 1902, was executed between the corporation and the syndicate managers.

The report further states that the item of $21,236,040 for sinking funds and reserves for depreciation in the balance sheet is made up as follows: Sinking fund on United States Steel Corporation bonds, $1,520,000; sinking funds on bonds of subsidiary companies, $1,264,197; reserved for general depreciation, including that of the ore, coal and coke properties, and for extraordinary outlays which may be required for unusual expenses, for improvements and for renewals, $18,451,843; total, $21,236,040.

The inventories are taken on the basis of the actual cost of the materials, including labor at the several departments of the companies holding the same, and this cost is below the average current market price of such commodities.

The business of the companies has been put on practically a cash basis. The losses actually incurred through bad debts have been very small, and little, if any, loss in the collection of accounts and notes receivable is anticipated. About 70 per cent of the total current monthly accounts due from customers is now being generally collected within 30 days, and it is the effort of the several managements to maintain the business on a strictly cash basis.

The business of the United States Steel Corporation for all practical purposes began April 1, 1901, from which date interest on the bonds and dividends on its preferred stock began to accrue. The board of directors has determined that the fiscal year, instead of running from April to April, shall correspond with the calendar year, and in order to give sufficient time for preparation of annual reports to stockholders the by-laws have been amended so as to provide that future annual meetings shall be held in April.

LONG DISTANCE ELECTRIC POWER TRANSMISSION

The combination of science and audacity which characterizes much of the long distance transmission work done during the last few years in California was strikingly brought out at the 220th meeting of the New York Electrical Society, held January 15th, by Dr. F. A. C. Perrine, who lectured on "The Power Plants of the Pacific Coast." Dr. Perrine said that one of the objects of his lecture was to show the men in the east that the far westerners were no mere rough-and-tumble engineers, and it was generally admitted that this point was abundantly proved. A more interesting series of pictures of engineering triumphs than that thrown on the screen by Dr. Perrine has seldom been presented to a scientific audience.

Dr. Perrine's work has been such as to make him a recognized authority on the subject of long distance electrical transmission. As consulting engineer he had much to do with the pioneer work of the great Standard Company, and is now president of the Stanley Electric Manufacturing Company, of Pittsfield, Mass., the designing engineers and manufacturers of electrical apparatus which has made extreme potentials possible.

During the discussion Mr. T. C. Martin mentioned the fact that the week was one which would be notable in the history of the American Institute of Electrical Engineers and the New York Electrical Society, inasmuch as on one of its evenings the Institute learned the details of the most marvelous achievement known in the transmission of intelligence, the sending of a wireless message across the Atlantic, from the lips of the man who had done it, and on another evening the Society listened to a description of the longest power transmission in the world, that from Colgate to San Francisco, 215 miles long, by one who had taken a most active part in the work.

Dr. Perrine's paper, which was most entertaining as well as being of great technical value, is to be published by the Society.

AMERICAN COPPER, LEAD AND ZINC FOR GERMANY.—The ENGINEERING AND MINING JOURNAL is informed by Hon. Frank H. Mason, the United States Consul-General at Berlin, that the firm of Gustav Baerwald, Nachfolger, of No. 39 Chaussee Strasse, Berlin, Germany, desires to form connections with some firms in the United States relative to the importation of copper, zinc and lead ores into Germany. The firm refers to Dun's and Bradstreet's commercial agencies in regard to its financial standing.

WHITE HORSE MINING DISTRICT, YUKON TERRITORY.

By WILLIAM M. BREWER.

Between the Atlin District and White Horse, the northern terminus of the White Pass & Yukon Railway, no discoveries of minerals have been reported. In fact, but very little is known of the country. The pioneers who traveled down the lakes to the Lewis and Yukon rivers in boats and on scows were all too anxious to reach the Klondike, while those who built cabins for stopping places en route had their time fully occupied in making money by attending to the wants of the travelers. Consequently no attention appears to have been paid to prospecting from the shores of the lakes or the banks of the rivers by the old route, and since the new route was established by the construction of the railway, apparently every traveler has pushed on to White Horse in too much of a hurry to take time to prospect en route.

The railway follows a wide valley from the foot of Bennet Lake to White Horse instead of the longer route by the lakes and Lewis River. So far as one can see from the train there is but little indication of mineral near the line of the railway.

IRON ORE OUTCROP, PUEBLO CLAIM, WHITE HORSE.

DIKE ON COPPER KING CLAIM, WHITE HORSE.

The geology around White Horse is particularly interesting. The rapids in the Lewis River at the present time may be considered the head of navigation, because since the opening of the railway few travelers follow the custom of the pioneers of shooting the rapids. The formation cut through by this channel of the river is eruptive, but the extent of these rocks cannot be determined because of the sand which overlies them on both sides of the river and hides all the geology. In fact, one must travel nearly four miles back from the river on the west side before many natural exposures of the geology occur. A close grained igneous rock, probably diabase, is the first rock—*in situ*—the writer observed in that direction. Apparently a series of dikes of this rock occur, occupying a belt having a northwesterly line of strike; next to this belt towards the southwest occurs a zone of felsite and limestone with garnets and tremolite. The extent of this formation is very variable. The writer crossed it at several points, and apparently at each, the superficial area covered, varied in extent. The best opportunity of determining the general geology of the district was afforded during the writer's visit to the White Horse coal mines when he followed up Johnson Creek from a point on the railroad about 10 miles south from White Horse. This creek traverses the formation, its course being northeast from its source in a chain of mountains in which occur the coal measures, and situated about 11 miles by survey to the southwest from the White Pass and Yukon Railway. The following is the series of formations crossed from the railroad, so far as can be observed from natural exposures, much of the geology being hidden by moraine deposits, moss and debris from rock slides: For nearly two miles granite, next diabase, next a bold bluff of felsite, next limestone, next granite. Apparently this belt of granite is continuous for some 6 miles or until the range of mountains, made up of conglomerates and sandstones, is reached. Beyond this range the writer did not travel.

So far as one can judge from a cursory examination, nearly the same series of rocks occur in crossing another section, about 14 miles northwesterly from Johnson Creek, except that the felsite and limestone appear to occupy much more extensive area. They are found in two zones each having a northwesterly trend, but not exactly paralleling each other. At the northwest end they form one zone or belt upwards of 3,000 feet in width. The felsite is much more siliceous at some places than at others, and suggests that its origin may be from alteration, possibly from an impure limestone rather than from eruptive action. Garnet and tremolite are closely associated with the felsite as well as bornite, copper carbonates and less frequently chalcopyrites. These zones composed of limestone, felsite and diabase dikes comprise the metalliferous bearing regions, while the conglomerates and sandstones, near the head of the Johnson Creek, yield bituminous coal possessed of fine steaming qualities.

The writer during his stay in this section personally visited the following mineral claims situated in the zones referred to: Copper King, Ora, Copper Queen, Carlisle, Tamarack, Anaconda, Rabbit's Foot, Pueblo, Arctic Chief, Best Chance, Verona, Grafter, Black and Brown Cubs, as well as the coal mines owned by the White Horse Coal Company.

The mineral claims are located from northwest to southeast, the more northwesterly being the Anaconda and Rabbit's Foot, which adjoin each other, the latter being located on the southwest side of the former. The more southeasterly are the Black Cub and Brown Cub claims. The distance in an air line between these extreme points is about 12 miles. In following out the trend of the zone towards the southeast from the Anaconda and Rabbit's Foot, one is impressed with the fact that there are apparently two zones southeast from the Rabbit's Foot and Anaconda, each of which is copper bearing. The easterly of these is represented by the Copper Queen, Copper King, Ora, Carlisle, Tamarack, Grafter, Best Chance, Verona and possibly the Black and Brown Cub mineral claims, while the westerly is represented by the Pueblo, Arctic Chief and other mineral claims. The distance intervening between these zones is about 1½ miles, which is the distance between the Copper King and Pueblo. Apparently this intervening space is occupied by granite, but the geology is so much hidden by moraine that until more thorough prospecting has been done it is not safe to express any unqualified opinion.

The most important impression produced on the mind of the writer after as careful an examination as time would permit was the strong resemblance from geological and mineralogical standpoints which this region bears to Texada Island in the Straits of Georgia, between the mainland of British Columbia and Vancouver Island. The country rock is practically the same, and the ores are almost identical. The gangue of the copper ore at White Horse is chiefly garnet, tremolite and occasionally magnetite and hematite, and so with the exception of the hematite is the gangue of the copper ores on Texada Island. Bearing this resemblance in mind, as well as the fact that bornite ore is found at a depth of 500 feet on the Copper Queen mine on Texada Island, at the contact between limestone and felsite, the writer is of opinion that there is every encouragement to the owners of prospects at White Horse to develop their properties and attain depth. The theory that at White Horse granite will be found underlying the limestone, felsite and diabase is one the writer saw no reason for upholding. Evidently the original formation of this section was limestone, and the diabase and granite are intrusive rocks. So far as the felsite in concerned, that is either intrusive or alteration from some other rock, probably limestone. The ore on all the claims occurs as replacement impregnations, usually in the felsite, but sometimes in the limestone. So far as can be determined from the work done the diabase dikes bear no relationship whatever to the occurrences of ore, neither do the granite. True, the contacts between the felsite and limestone are not as well defined usually in the White Horse field as on Texada Island, but this may be because all the workings in the former are shallow, and as a matter of fact these same contacts on Texada Island are better defined at depth, and more regular on the 500-ft. level of the Copper Queen Mine than elsewhere.

Considering the various mineral claims in detail will give the reader a better idea of their importance than can be gleaned from any general description of the field. It is to be regretted that so limited a quantity of work had been performed, also that distance from smelters practically prohibits men of small means from developing their properties as extensively as their merits warrant, but if the coal discovered should prove a good coking coal, then there is within the boundaries of the White Horse field every facility for economic smelting operations, because the limestone and iron ore both occur in quantity and are easily accessible.

Copper King Group.—This group, comprising the Copper Queen, Copper King and Ora is the most important in the field. One shipment of ore from the Copper King claim, eight and one-half tons, was made to the Everett Smelter in Washington during the winter of 1900-1901. This yielded per ton 46 per

cent (dry assay) copper, together with low gold and silver values, the shipment netting the miners $731 above freight and treatment charges.

Two shafts have been sunk in a depression between bluffs of limestone and felsite. The depression is in felsite, and in this bornite and copper carbonate ores outcrop. One shaft 26 feet deep is at the contact of the lime and felsite, the other 18 feet deep is in felsite; from the latter shaft a drift 22 feet long had been run, and from this the shipment of ore referred to was taken. The line of strike of the ore body follows the depression or narrow gulch mentioned, and is north 35° west magnetic. There is a maximum thickness of ore of about 12 feet at the shallower of the two shafts. Both shafts were sunk in ore, and at the time of the writer's visit there were about 75 tons of good grade ore on the dumps. No work had been done on the Copper Queen claim adjoining the Copper King on the northwest or on the Ora claim adjoining the Copper King on the southeast. McIntyre Creek, which flows through these claims, affords a good supply of water for domestic, steam or concentrating purposes. An ample supply of timber for mining, log building and fuel grows on the surface of the claims.

Carlisle Mineral Claim.—This adjoins the Copper King and Ora claims on the east. A shaft about 50 feet deep, closely timbered, had been sunk about 1,000 feet east from the Copper King shafts. Apparently the country rock between these points is all limestone and felsite, but the contacts are not well defined. From the bottom of the Carlisle shaft a short crosscut had been run, the ore having dipped away from the shaft towards the north. Drifts both to the east and west had been driven. In the west drift a fair showing of bornite occurred in the limestone, but its full thickness could not be determined because the drift was run in the limestone and ore left on the northern side, where the thickness could not be ascertained, it varied from a few inches to about 2 feet, and occurred in irregular pockets or lenses. In the east drift only a narrow stringer of ore was observable. The bottom of the shaft presented peculiar features. The thin edge of a wedge of granite with gneissoid structure was exposed in the east corner; this was succeeded by a calcareous siliceous, garnetiferous rock containing well-defined crystals of hornblende and actinolite, of which the east wall and nearly all the bottom of the shaft was composed, while on the west side of the bottom occurred limestone and felsite, but having no well-defined line of contact.

Anaconda Mineral Claim.—This is located northwesterly from the Copper Queen, about 2,500 feet distant. A small creek locally known as Porter Creek flows along the base of a bluff, on which bornite with some malachite and azurite outcrops in felsite. This felsite bluff is on the southwest side of the creek, while a limestone bluff occurs on the northeast side, the creek apparently marking the line of contact. A crosscut tunnel about 100 feet in length had been run into the felsite bluff, but not in the right direction to intersect any ore body which the outcroppings indicated might occur, consequently the work is thrown away, although two tunnels run from the main crosscut (both toward the south, while the main one was driven to the west) show some indications of ore at their faces, and as these were being run towards the right direction to intersect an ore body indicated by the outcroppings, there was good reason to continue the work on one or both of these.

Rabbit's Foot Mineral Claim.—This claim joins the Anaconda on the southwest. There have been three prospect holes sunk, two about 15 feet each and one about 10 feet. These were sunk on outcroppings of bornite and copper carbonates in felsite. Closely associated with this felsite is a dark-colored limestone. The gangue of the ore is garnet and magnetite. The outcroppings cover quite an extensive area and plateau, and had the work been systematically done in one place quite satisfactory conditions might have been exposed.

Both McIntyre and Porter Creeks flow very closely together, and almost parallel near the Rabbit's Foot Claim. A narrow ridge not exceeding 350 feet across the base separates the waters of these two creeks.

Near the west line of the Rabbit's Foot Claim granite with gneissoid structure occurs in contact with felsite, and near the south line of the Rabbit's Foot the channel of Porter Creek crosscuts a dike of diabase. Apparently the west line of the claim is the western boundary of the mineral bearing zone, and the igneous rock to the south is the narrow edge of the wedge of country rock which appears to split the zone in the manner already referred to.

Grafter Mineral Claim.—This is located about 3 miles southeast from the Copper King. An outcrop nearly 30 feet wide has been crosscut and opened by shallow prospect holes exposing bornite, azurite and malachite ore in felsite and limestone, with the line of contact not well defined. To the south is a dike of porphyritic quartzose rock, while on both the northeast and southwest sides is granite. A high mountain range farther to the south is said to be composed of limestone of dark color and stratified. The line of strike of the ore-bearing rocks is apparently north 30° west, but the dip is not determinable because the work does not show the limits or walls of the ore body. Nor is its continuity along the line of strike determined or in fact sufficient work done to warrant any estimate as to ultimate value.

Best Chance Mineral Claim. This adjoins the Grafter on the north, and about 800 feet north of the outcrop on that claim there occurs an enormous surface showing of magnetite in felsite, epidote, and garnet. This showing is about 100 feet wide, having its line of strike apparently parallel with that of the Grafter ore body. In a prospect hole about 6 feet deep, on the southwest edge of this outcrop, chalcopyrite and bornite are exposed, associated with a fine-grained felspathic rock. To the northeast of the Best Chance claim is a wide belt of gray granite, apparently the same as occurs on the northeast of the Copper King claim.

Verona Mineral Claim.—This is situated about 2,000 feet southeast from the Grafter. Only a little work has been done, but in a well-defined contact between limestone and felsite there occurs bornite and chalco-pyrite with actinolite, hornblende and garnet crystals in the gangue. This outcrop can be traced some distance to the south. It is not of any very great width, but is very persistent. To the southwest of the ore-bearing zone occurs a wide belt of granite, which separates it from another ore-bearing zone on he adjoining claim.

Arctic Chief Mineral Claim.—This adjoins the Verona on the southwest, and occupies a much more elevated position, being about 500 feet higher than any of the other claims in the district. The outcrops are magnetite, with impregnations of chalco-pyrite, bornite and occasionally copper carbonates, the gangue contains mica and garnet. The line of strike is northwesterly and dips 70° to the east. Two tunnels have been driven to crosscut the ore body, one 39 feet, inclusive of the open cut, the other 18 feet, also inclusive of the open cut. In the longest tunnel an ore body 14 feet thick had been crosscut. The hanging wall of this is limestone and the foot wall felsite with garnets. On the southwest side of this ore-bearing zone occurs granite, apparently maintaining its continuity towards the northwest and forming the southwesterly boundary of that ore-bearing zone in which is situated also the Pueblo mineral claim.

Pueblo Mineral Claim.—This claim is situated about 1½ miles westerly from the Copper King mineral claim, but apparently in a distant mineral bearing zone, because the country rock between the two occurrences of mineral is composed of hornblendic granite, in which occasionally occur quartz lenses carrying some bornite ore.

The outcrop on the Pueblo is about 200 feet square, and a portion of it occurs as a bold bluff about 30 feet high. This outcrop is chiefly composed of red hematite iron ore with impregnations of bornite and chalcopyrite at the contact of limestone on the northeast side and a quartzose rock, too much altered to be definitely classified, but resembling quartzite, on the southwest. The head of the west fork of McIntyre Creek is situated in close proximity to this outcrop.

More work has been done on the Pueblo than on any other of the White Horse propositions, but because of the water and ice in the shaft the writer was unable to examine the workings, which he was informed consisted of a shaft 68 feet deep, a drift 128 feet long, and a winze sunk from the drift about 32 feet deep. All these workings are said to be in ore, and from the size of the dump about 100 feet in diameter, and about 20 feet high, of sugar-loaf shape, this information is probably correct. This dump consists of iron ore with quite low copper values, too low apparently, to possess commercial value as copper ore, but when the iron is taken into consideration this ore should possess value for fluxing, if smelting operations are ever conducted in the district.

Hoisting and pumping machinery are on the ground, and were used in performing the work some months previous to the writer's visit.

IN THE COAL MEASURES.

White Horse Coal Prospects.—About 11 miles southerly from a point on the White Pass Railway, about 9 miles below White Horse, at an elevation of 4,000 feet by aneroid or about 2,100 feet above White Horse, occurs the coal-field which promises to afford to this district cheap fuel and possibly coke for smelting. From the railway a creek locally named Johnson, after the discoverer of the coal field, is followed nearly to its source. The strike of the coal seams, of which there are apparently three already opened, is north 30° east.

The geological conditions surrounding the coal field, which is composed of conglomerate, shale and sandstone, are as follows: To the southwest granite mountains, some of the peaks reaching an altitude of about 7,000 feet; to the north mountains apparently composed of a metamorphosed red shale flanked in the same direction by granite. If the coal measures maintained continuity towards the southeast, they should be found about half way between White Horse and Bennett; but about 5 miles easterly from the outcroppings the writer was informed that a belt of limestone occurred, forming high ridges, beyond which the coal measures could not be traced. Apparently they occupy a width of about 2,000 feet in the vicinity of the outcroppings.

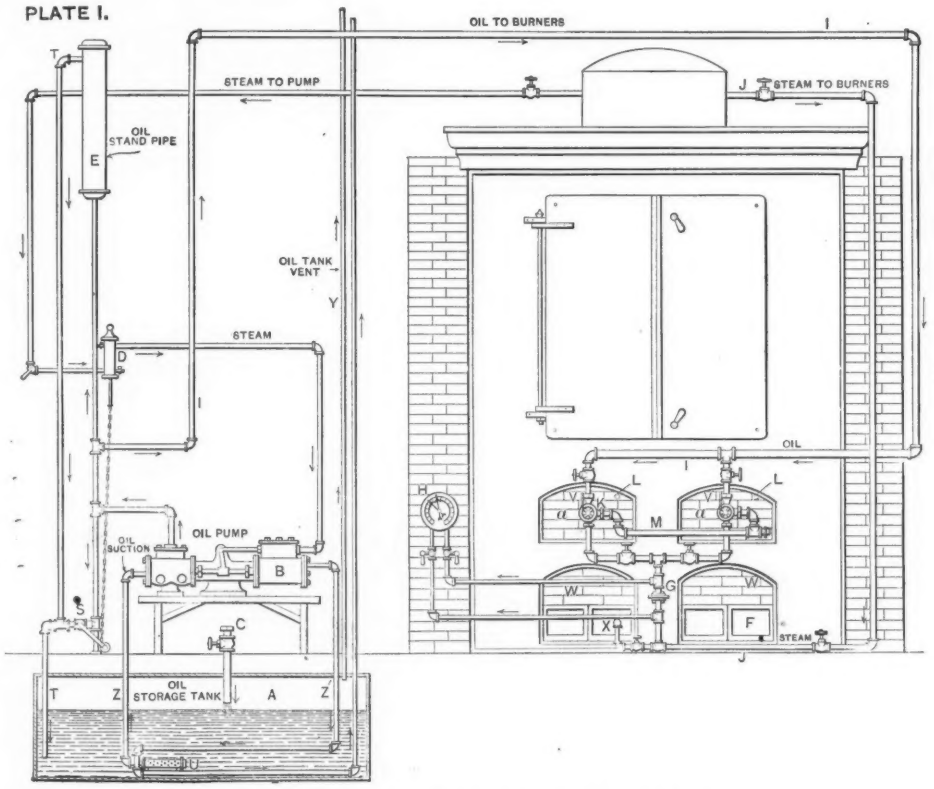
The first discovery was made in a narrow gulch between two high mountains. The first outcrop, which represents the lower seam opened, on which work was done, is about 5 feet in thickness. A short tunnel was driven on this, and the coal found to lie between a slate roof and a conglomerate floor. About 300 feet higher another seam outcropped, about 18 feet in thickness. On this a tunnel was run 60 feet in length. The coal lay between a slate hanging wall or roof and shale foot wall or floor. A sample of this coal, which is very free from slate, was hauled over the snow last winter to White Horse, and tested on the engines of the railway company. The superintendent of the railroad informed the writer that this test was very satisfactory, and the steaming qualities of the coal were fully determined. The third outcrop which may belong to a still higher seam or may be the same seam as the second mentioned, was discovered on the plateau apex of a mountain 700 feet higher than the gulch in which the two first outcrops were discovered, and easterly about half a mile distant. This outcrop had been opened by a shallow crosscut which exposed the seam 18 feet in thickness having the same line of strike, but dipping about 20° nearer the vertical than the other outcrops. A survey for a tram track from the railway has been made by J. E. Beatty, assistant engineer for the White Pass & Yukon Railway Company, and all arrangements perfected to organize a company to acquire 1,500 acres of this coal-field. The route followed by the survey line is through a comparatively easy country, to construct a narrow gauge line of railway.

TESTS OF BEAUMONT OIL AS FUEL.

The following report of the results of the fuel value of crude petroleum from the Export Oil and Pipe Line Company, of Beaumont, Texas, as used to operate a horizontal return tubular boiler at the plant of the West Side Hygeia Ice Company, West 19th street, New York City, has been submitted by Prof. James E. Denton, Professor of Mechanical Engineering, Stevens Institute of Technology, Hoboken, N. J.

This establishment is provided with three return tubular boilers, each 6 feet in diameter and 18 feet long, containing about 1,000 square feet of heating surface, two being used at a time to provide about 180 boiler horse-power from buckwheat coal with natural draft, for operating their ice-making machinery, under a very steady load throughout each 24 hours. One of the boilers, about 1½ years of age, was fitted for the use of the oil by the International Gas and Fuel Company, of Chicago, which applies the Williams oil burner.

PLATE I.



APPARATUS USED IN TESTING BEAUMONT OIL.

ARRANGEMENTS FOR BURNING OIL AND FOR TESTS.

Referring to the accompanying plates, the modifications of the boiler furnace, and general arrangements for testing, were as follows:

Four ducts of hollow tile (*F* Plates I and II) 10 by 6 inches, were laid in the ash-pit extending nearly to the bridge wall, and the ash-pit door openings closed by brick work (*W* Plates I and II) around the outer ends of the tile.

The forward bearer of the grate bars (*N* Plate II) was dropped, about half of the forward set of bars removed, and a course of fire brick (*O* Plate II) laid with fire clay over the whole upper surface of the grates, so that air entering through the tile could flow back along the outside of the latter, and then around and up between the front end of the grate bars through an area a little greater than that of the aggregate cross-section of the tiles.

A checker work (*P* Plate II) of about 50 loose fire brick was built over the grates, the space back of the bridge was filled with ashes (*R* Plate II) flush with the top of the bridge wall, and a single-course floor (*Q* Plate II) of fire brick laid over the ashes. An iron bar (*a* Plate I) was bridged across the middle of the fire door opening, and the remainder of the latter closed with the fire brick (*V* Plates I and II) flared on the inside, a small opening (*L* Plate I) being left for applying the torch to the burners. Into the iron bar across each door was screwed the burner (*K* Plate II).

Oil enters the burner vertically through the opening (*b* Plates III and IV) under control of the cock (*c* Plate III) regulated by the handle (*d* Plates III and IV). Steam enters the opening (*e* Plates III and IV), and flows through the conical opening (*f* Plates III and IV), regulated by the hand-wheel (*g* Plates III and IV) to meet the oil as the latter falls between the vertical flanges (*h* Plate IV). A third opening (*i* Plates III and IV) in the burner draws air from the back of the furnace through a fire-brick duct built on top of the grate, and connecting with the bottom side of the latter at its rear, while the front end communicates with the iron pipe (*M* Plate I) connected to both burners.

A mixture of steam, oil and heated air is therefore blown out of the burner, and this is joined with the main current of air flowing up around the front end of the grate bars, somewhat heated by its passage along the underside of the grate. The oil was stored in an iron tank (*A* Plate I), 7 feet in diameter by 5 feet deep, sunk in the ground, into which the barrels, in which the oil was received, were emptied, from time to time, through the pipe (*C* Plate I). The top of the tank was closed, ventilation being afforded by the pipe (*Y* Plate I).

A steam pump (*B* Plate I) drew oil from the tank through the strainer (*U* Plate I) by the pipe (*Z* Plate I), and delivered it to the standpipe (*E* Plate I). Thence it flowed by the pipe (*I* Plate I) to the burners, under a head of about 10 feet. The pump ran constantly, and delivered a surplus which flowed back to the tank through the pipe (*T* Plate I). The oil pump was provided with a device* (*D* Plate I) having a piston connecting a chain with a cock (*S* Plate I), which automatically opened when the boiler was not under steam pressure so that the standpipe would be emptied of oil by the latter flowing to the storage tank. The steam exhaust of the pump passed through the tank by the pipe (*Z'* Plate I), and thence to the atmosphere. Thereby high cold test oil is kept sufficiently fluid in cold weather to flow freely into the strainer, but it is not sensibly heated to the touch when it arrives at the burner.

The pipe (*X* Plate I) is a blow-off for draining the burner steam supply pipe (*J* Plate I) of water in starting the burner. The air entered the ash-pit tiles under the natural draft of the chimney, 70 feet high by 42 inches square, connecting to the boiler tested by a 40-in. flue about 30 feet long. In order to measure the steam consumed by the burners the opening in the flange-union (*G* Plate I) on the steam pipe (*J* Plate I) was reduced to ⅜ inch by diaphragm, and the pressure each side of this opening measured by the differential steam gauges (*H* Plate I). After the tests the readings of the differential gauge were duplicated while the steam flowing was condensed and weighed. The amount of oil consumed was determined by weighing the barrels before emptying them into the storage tank, and by means of a float in the latter operating over a scale which was calibrated for the tests. The feed water was measured by a reliable meter, made by the Neptune Meter Company, of New York, which was calibrated at proper intervals. All blow-off connections were properly tested for tightness.

The boiler was regularly cleaned internally every ten weeks, and the period of the tests was at the middle of one of these intervals.

*This is a safety device required by western insurance rules.

OPERATION OF THE BOILER.

The preparations for use of the oil were completed Monday afternoon, November 25. The burners were immediately lighted, steam quickly raised, and from one-half to more than the whole of the boiler horse-power required by the factory then generated by the boiler until the following Saturday night without the slightest hitch, the burners being under the charge of Mr. T. H. Williams, the patentee of the burner, and his assistant. During this period evaporative tests at various horse-powers were made.

TIME REQUIRED TO RAISE STEAM.

The boiler was allowed to cool from Saturday, November 30, to the following Wednesday, when the brick work of the setting was cold, and the water in the boiler at 64°. The time to raise 85 pounds of steam was then determined to be 59 minutes. In a similar test made later, with a coal fire, started with a very liberal amount of dry wood, steam was raised in 1 hour and 17 minutes.

EFFECT OF THE OIL ON THE BOILER AND SURFACE.

After the steam-raising test the boiler was operated 24 hours with oil, to use the 117 barrels provided for the test. It was then cooled, and the oil burning apparatus removed to prepare the furnace for comparative coal evaporative tests. The boiler and furnace were then examined. No trace was found of any action of the oil on the boiler. There was no oily matter on the internal brickwork, nor any discoloration of the latter, and there was less than 1-64 inch of soot in the tubes, which had been swept clear of coal ashes at the beginning of the use of the oil.

EVAPORATIVE TESTS.

The tests with the oil were made at capacities varying from 112 horse-power—which was thought to be about the horse-power at which the boiler was operated in its regular use with coal—to 220 horse-power, which represented the limit of satisfactory air supply available from the draft power of the chimney with a wide open damper. That is, up to 220 horse-power there was sufficient air supply to prevent any appearance of smoke in the flame, or at the top of the chimney, but more than this horse-power caused curling streams of smoke to appear at the edges of the flame in the furnace, and a light gray vapor to be visible at the chimney top. The test with coal was made at 93 and 119 horse-power, the first amount being that demanded of the boiler when operated with its companion boiler under the steam damper regulation common to the regular regime of the factory, and the second amount being the greatest horse-power which could be obtained with the dampers wide open and the companion boiler checked so as to allow the test boiler to take all of the load that it could.

The results of the tests are given briefly in Table I. and more in detail for one oil and one coal test in Table II.

From these tables the following conclusions may be drawn:

For a range of from 112 to 220 horse-power the total evaporation from and at 212° per pound of oil varied from 15.71 to 15.29 pounds of dry steam, and the burner consumption varied from 3.1 to 4.8 per cent of the boiler output, so that the net evaporation ranged from 14.74 to 15.16 pounds of water per pound of oil.

2. The combustion of the oil by the burner was practically perfect, since by the evidence of the Heat Balance (lines 40 to 47, Table II) the heat accounted for by the steam production, the hot gases flowing to the chimney, and a reasonable allowance for radiation represents about 98 per cent of the total heat of combustion of the oil when burned in oxygen in a calorimeter.

3. The boiler utilized about 78 per cent of the heat of the fuel (line 40, Table II), which represents the best average boiler practice and the percentage of steam consumed by the burners is a minimum for steam-jet burners.

4. An excess of cold air probably caused a loss of evaporation for the smaller horse-power, but for the 189 and 220 horse-power tests there was no excess of the air necessary for complete combustion. Consequently for the two higher horse-powers the net evaporation of 14.8 pounds of water per pound of oil may be considered to represent the best economy that is to be expected from the use of the oil as a fuel with steam-jet burners.

5. The evaporation from and at 212° per pound of coal was 9.17 and 8.94 pounds of water for 93 and 119 horse-power. The coal afforded 11.6 per cent of ash, and 14,680 B. T. U. per pound of combustible when burned in oxygen in a calorimeter, which represents an excellent No. 1 buckwheat. The firemen were the regular employees of the Ice Company. They were skillful operators, and secured practically complete combustion of the coal, as is shown by the absence of carbonic oxide (line 37, Table II) in the furnace gases, and the fact that the radiation and imperfect combustion item of the Heat Balance (line 45, Table II) is 3.4 per cent. Considering that the coal was laden with 6.2 per cent of moisture, and was consumed in the furnace to about 17 per cent of ash, the evaporative results per pound of wet fuel are excellent. They correspond to an evaporation of 11.79 pounds from and at 212° per pound of combustible, which affords the very excellent boiler efficiency of 77.6 per cent (line 22a, Table II).

6. Had the draft been sufficient to burn enough coal per hour to produce about 10 horse-power per square foot of heating surface, as in the case of the 189 horse-power test with the oil—and as is commonly guaranteed in the sale of modern boilers—the boiler efficiency would probably be reduced on account of the greater velocity of the heated gases over the heating surface resulting in a higher chimney temperature, and hence the waste of a greater proportion of the heat of combustion. Such reduction of efficiency would probably have made the evaporation per pound of wet coal only about 8.5 pounds. But had the percentage of moisture in the coal have been the average amount, or 3 per cent, the evaporation would have been about 8.75 pounds.

7. The comparative fuel costs of coal and oil for the particular conditions of the ice factory where the tests were conducted are therefore as follows:

(A) For producing the horse-power required by the factory, or one horse-power per about 20 square feet of heating surface, with the moisture and ash as found:

1.	Moisture in coal	6.2 %
2.	Ash	16.2 %
3.	Weight of oil per gallon	7.66 lbs.
4.	Weight of oil per barrel of 42 U. S. gallons	322 lbs.
5.	Evaporation per pound of wet coal from and at 212 degrees	9.17 lbs.
6.	Net evaporation per pound of oil from and at 212 degrees	1.51 lbs.
7.	Ratio of oil to coal $\frac{15.1}{9.17} =$	1.65
8.	Number of barrels of oil equivalent to 2,240 lbs. of coal	4.23
9.	Price of coal per 2,240-lb. ton, without cartage and cost of ash removal	$3.00
10.	Equivalent price of oil per barrel of 42 U. S. gallons	$0.71

(B) For producing horse-power upon the commonly guaranteed basis of one horse-power per 10 square feet of heating surface, and with an average percentage of moisture and ash in the coal:

1.	Moisture in coal	3 %
2.	Ash	17 %
3.	Evaporation per lb. of wet coal from and at 212 degrees	8.75 lbs.
4.	Net evaporation per lb. of oil from and at 212 degrees	14.8 lbs.
5.	Ratio of oil to coal $\frac{14.8}{8.75} =$	1.69
6.	Number of barrels of oil equivalent to 2,240 lbs. of coal	4.12
7.	Price of coal per 2,240-lb. ton, without cartage and cost of ash removal	$3.00
8.	Equivalent price of oil per barrel of 42 U. S. gallons	$0.73

GENERAL COMPARISON OF FUEL COST OF OIL AND COAL.

The coals of the United States mainly used for the production of steam power on a large scale may be roughly distinguished as follows:

1. Coals mined west of Ohio and classed at bituminous, because the volatile constituents (hydrogen, nitrogen, oxygen, sulphur and gaseous carbon) are upwards of 36 per cent of their composition. On account of the high percentage of volatile matter it is not possible to secure perfect combustion in boiler furnaces. Therefore a high rate of evaporation is 7.5 lbs. of water from and at 212° in the best boilers at 10 square feet of heating surface per horse-power. These coals are used throughout the West and Southwest.

2. Small sizes of anthracite coal, varying from "Pea Coal," which passes through meshes of a ½-in. screen, to "No. 1, No. 2 and No. 3 Buckwheat" and "Culm," which pass through successively smaller screens, culm passing through $\frac{3}{16}$-in. to ⅛-in. mesh. The "Pea" and "No. 1 Buckwheat" sizes have been in use for several years in large power plants in Eastern cities, where the smoke from soft coal is objectionable, but recently the No. 2 and No. 3 sizes of buckwheat have begun to be used. The use of culm is as yet confined to the coal mining regions.

All of these sizes of anthracite afford practically the same evaporation per pound of coal if the percentage of ash is the same, as is frequently the case. But to produce equal horse-power with the sizes below No. 1 Buckwheat the draft of ordinary heights of chimney must be augmented by a centrifugal fan, or steam-jet blower, which consumes from 2 to 7 per cent of the steam generated.

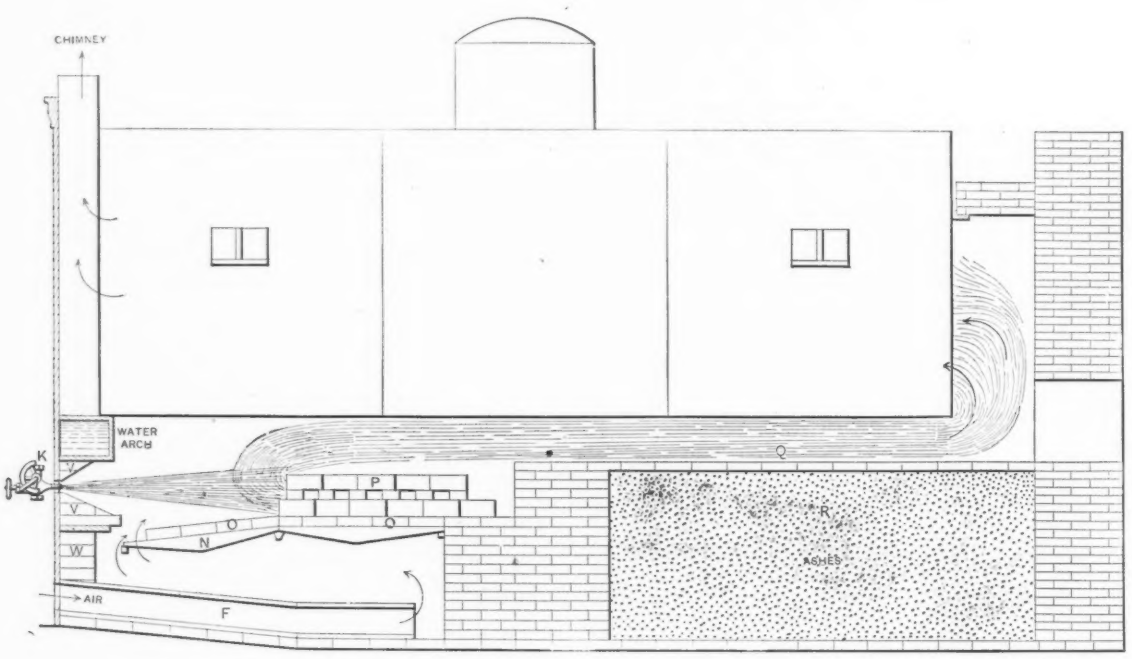
Assuming the extra draft supplied by a fan, the net evaporation afforded by these fuels is as follows in the best boilers yielding a horse-power of boiler capacity from 10 square feet of heating surface

Pea and No. 1 Buckwheat	8.75 lbs.
No. 2 Buckwheat	8.50 "
No. 3 Buckwheat	8.25 "
Culm	7.75 "

3. Bituminous coal mined in Pennsylvania, generally known as "Pittsburg Bituminous." This is coal whose combustible ingredients are chemically nearly the same as those of the western bituminous coals, but in which the proportion of volatile matter is sufficiently less to enable complete combustion to be effected in the boiler furnaces. It, therefore, affords an evaporation of 9.5 lbs. of water per pound of coal from and at 212 degrees in the best boilers at 10 square feet of heating surface per horse power.

This coal is used in the mills of Pennsylvania, on locomotives, between Pittsburg and St. Louis, and on the steamers of the Great Lakes.

PLATE II.

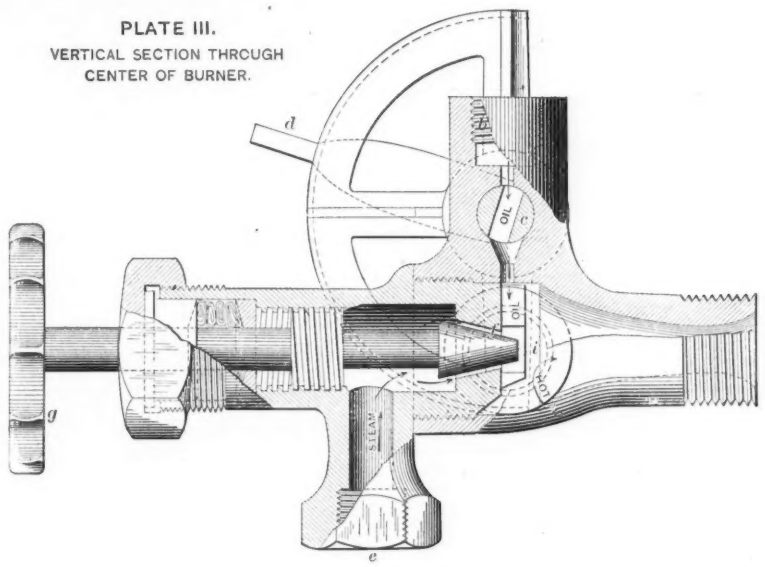


SECTIONAL VIEW OF FURNACE USED IN TESTING BEAUMONT OIL.

4. Soft coal, such as "Pocahontas" and "New River" mined in West Virginia, "Cumberland" coal from Maryland, and "Clearfield" coal from Pennsylvania, whose volatile ingredients are less than 25 per cent, and which are therefore classed as "Semi-Bituminous" coal. They afford the maximum heating power, and can be perfectly consumed in boiler furnaces.

These coals are used in the mills of eastern cities wherever the smoke laws are not too stringent, and in the Atlantic steamship traffic. Under the ordinary conditions of hand-firing they afford 10.0 pounds evaporation per pound of coal of average moisture. With mechanical stokers, and patent furnaces introducing air over the fire, or with when operated at 10 square feet of heating surface per horse-power or less, on account of the use of an excess of cold air, or imperfect combustion, due to unskillful manipulation of the fire. But the same influence may again be supposed to act to reduce the evaporation for the oil, so that the ratio R (line 3), and hence the equivalent prices per barrel (line 4), may still be the same for each coal as given in the table, with a probability, however, of an advantage to the consumer, since a fireman may be expected to better approximate the conditions of perfect combustion with oil than with coal, and because there will probably be less variation in the heat generating qualities of oil than occur with coal from the variation of the percentages of ash and moisture.

PLATE III.
VERTICAL SECTION THROUGH CENTER OF BURNER.



WILLIAMS BURNER USED IN TESTING BEAUMONT OIL.

Green's economizer, they afford 10.5 and 11 pounds, according as the per cent of ash varies from the maximum of 10 per cent to 5 per cent.

Table III applies the above rates of evaporation to determine the price at which Beaumont oil should be sold to be equivalent in cost of fuel to the coals described at assumed prices for the latter.

For example, at $3.00 per ton of coal the price of oil per barrel of 42 U. S. gallons to obtain the same horse-power as from coal by the same expenditure of money for fuel is:

For western bituminous coal (line 9, column 2)	$0.85
For anthracite culm (line 9, column 3)	$0.82
For No. 3 Buckwheat, or barley (line 9, column 4)	$0.77
For No. 2 Buckwheat, or rice (line 9, column 5)	$0.75
For No. 1 Buckwheat and pea (line 9, column 6)	$0.73
For Pittsburg bituminous (line 9, column 7)	$0.67
For best semi-bituminous:	
Hand-fired (line 9, column 8)	$0.64
Mechanical stokers and patent furnaces — 10% ash (line 9, column 9)	$0.60
Mechanical stokers and patent furnaces — 5% ash (line 9, column 10)	$0.58

REMARKS ON TABLE III.

The evaporative figures in line I of Table III represent the best average results from the coals with the best boilers, when the latter yield a horse-power with about 10 square feet of heating surface, or evaporate about 3.5 lbs. of water per hour from and at 212 degrees per square foot of heating surface.

Boilers are forced to a greater rate of evaporation, so as to yield, for instance, one horse-power from 5.00 square feet of heating surface, as in the case of the forced draft practice of the Atlantic steamers, or to a greater degree, as in locomotive practice. The evaporation per pound of coal is then reduced below those given in line 1 of Table III, but as it may be assumed that the evaporation of the oil (line 2) would also be reduced in practically equal proportion, the value of the ratio (line 3) will be approximately the same for all rates of evaporation. Hence, the equivalent prices of oil per barrel in the table may be considered to apply for any one of the coals to rates of evaporation greater or less than that represented by one horse-power of capacity per 10 square feet of heating surface.

Boilers of the best design will also be found which afford less evaporation that that specified in line 1

PHYSICAL AND CHEMICAL TESTS OF OIL.

Samples of oil were collected from each barrel as it was emptied into the storage tank. A mixture of these was tested in the Laboratory to determine the following data:

Specific gravity	0.920	
Flash point	142°	F.
Burning point	181°	F.
Cold test	— 6°	F.
Calorific value per pound by oxygen calorimeter	19060	B. T. U.
Chemical Composition — Carbon	84.60	per cent.
Hydrogen	10.90	"
Sulphur	1.63	"
Nitrogen	0.00	"
Oxygen	2.87	"

Another analysis of a different shipment of oil from the same well is given in Table II.

SULPHURETED ODOR FROM OIL.

The presence of sulphur in the oil gave rise to a strong sulphureted hydrogen odor from the storage tank. No odor, however, resulted from the combustion of the oil.

EFFECT OF SULPHUR IN THE OIL UPON LIFE OF BOILERS.

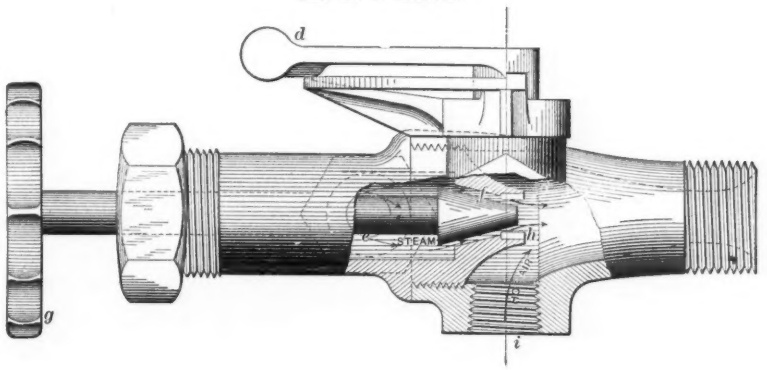
Excellent Pittsburg coal contains as high as 1.7 per cent of sulphur, and its use affords the average period of the life of boilers. In generating equal horse-power with such coal the amount of sulphur in the furnace gases will be the same with the oil as with this coal, if the sulphur in the oil is as high as 2.6 per cent, which considerably exceeds the proportion of sulphur in the Beaumont oil. An excellent grade of Indiana coal with 3.5 per cent of sulphur is used on locomotives without being identified with any greater depreciation of the life of fireboxes than occurs with Pittsburg coal. The equivalent of the sulphur in this Indiana coal for providing equal horse-power with the oil is 6.9 per cent. In view of these facts there need be no apprehension of shortening the life of boilers by the use of the oil. Sulphur in coal in excess of 2 per cent is productive of an excessive amount of clinker, and makes a "dirty" fire, but there is no equivalent of this effect on account of sulphur in the oil.

LABOR SAVING BY USE OF OIL.

It is probable that one fireman can attend to 30 oil burners of 100 boiler horse-power each. This fact will permit a saving for firing labor in hand-firing plants of more than about 500 horse-power capacity, and of more than about 1,000 horse-power capacity in mechanical stoker plants. This saving will, under average conditions of coal and wages, amount to about 15 cents per ton of coal used for power in excess of 500 horse-power in hand-fired boilers, and in excess of 1,000 horse-power with mechanical stokers. There will also be a saving in ash handling labor, or helpers in the fireroom, which will probably be about one-fourth of the above amount. In cities the cost of carting away ashes will be saved. This amounts to about 10 cents per ton of all coal used. There will also be a saving in furnace repairs, which may amount to 2 cents per ton of coal.

The cost for handling the oil will probably be less than for coal for machinery, but much more for ground space, required for underground storage tanks.

PLATE IV.
HORIZONTAL SECTION THROUGH CENTER OF BURNER.



HORIZONTAL SECTION THROUGH CENTER OF WILLIAMS OIL BURNER.

DANGER FROM USE OF OIL.

Experiments with samples of the oil used for the evaporating tests show the following results regarding its inflammable qualities:

A pool of oil spilled upon a board cannot be ignited by a match. The latter extinguishes itself when the match is partly burned. The instant the match comes in contact with the oil, air is excluded from its lower surface so that the flame is above the oil, and it cannot therefore vaporize sufficient of the latter to bring vapor into contact with the flame of the match and ignite.

A splinter of dry wood, about ¼ inch square and 6 inches long, ignited at one end, will not ignite oil in a shallow dish, but when this splinter is smeared with oil the latter burns rapidly over the length of the splinter after the end of the latter is ignited to a

blaze by a match. The flame at the end of the splinter vaporizes the film of oil near it, so that the vapor floats into contact with the flame and ignites. This vapor, in burning, vaporizes and ignites the film farther along the splinter, until the oil over the whole length of the latter is aflame.

The principle governing ignition of a mass of oil below a body of air is that the oil must be vaporized and the vapor come into contact with a temperature above a red heat.

For example, a pan 10 by 14 inches filled with oil to a depth of about an inch, had a handful of blazing waste saturated with kerosene, thrown into it. The blaze of the waste was estinguished on its lower surface where contact with the oil excluded the air. Hence about 40 seconds elapsed before sufficient heat was imparted to the oil, by radiation and conduction from the burning waste, to vaporize enough oil to cause vapor to rise into contact with the blaze and ignite. Then the burning of this vapor rising from the surface of the oil immediately about the waste vaporized and ignited oil farther away, and thence the whole surface of oil was set blazing. The liquid oil then became heated throughout by conduction, and all of it gradually vaporized and burned.

After the pan of oil was once aflame if it was extinguished by covering the pan, the hot liquid continued to evolve vapor, so that a match thrown on the surface instantly reignited the whole of it. These experiments only serve to show that oil spilled to form a liquid pool, at ordinary temperature, about a boiler room, would not be ignited by a lighted match, or a hot coal, falling into it, and that even a lighted torch would have to be in contact with it for several seconds before it would inflame.

Some glass fruit jars, partly filled with oil, were kept at ordinary temperature for upwards of ten days. Lighted matches were then dropped into them through a half-inch hole in the cover without causing any ignition of the contents of the space above the oil, nor was there any flame caused by holding the lighted match just outside the hole in the cover. Also with the cover removed, so as to expose an opening of about 3 inches diameter, the contents of the jar above the oil could not be ignited by the flame of a match. The same results were obtained with the oil at 100° F. and no vapor could be seen escaping from the jar. These results showed that up to 100° F. the oil did not vaporize sufficiently to make a burning mixture of the air above the oil in a half-filled fruit jar. , That is, the oil vapor present was too greatly diluted with air to be inflammable.

At temperatures of oil from the flashing point, 142° to 200° F. vapor was visible as it escaped through the half-inch hole in the cover, which ignited with a match, and burned so as to form a feeble flame. This flame could not be blown inside of the cover, nor would a lighted match dropped through the cover affect the contents of the jar. These results showed that above 142° F. the oil vaporized sufficiently to drive out the air from the jar and fill the latter with vapor, which could not burn within the jar, as no air was present to support combustion; but on issuing from the jar and mixing with air the vapor could burn.

With the cover removed the application of the flame of a match to the vapor floating out of the jar would not ignite it at 1 inch or more above the outlet, but applied at the outlet the contents of the jar above the oil ignited, and burned with a sluggish flame for about a second, when combustion ceased. The upward current of vapor was then re-established, and the ignition could then be repeated.

This showed that the vapor in floating about an inch from the jar so diluted itself with air that it was inflammable, but closer to the jar it formed a burning mixture with the air, and being ignited at this point sufficient air found its way into the wide mouth of the jar to enable the contents of the latter to inflame. Then the upward current due to heat excluded the entrance of air, and combustion ceased, after which the upward vapor currents re-established themselves.

The experiments with the vapor of the oil show that its volatility does not give rise to inflammable vapor until it is heated above 142° F. Then as the vapor is essentially identical with that given off by gasoline at ordinary temperatures, all the well known safety precautions for the storage and handling of the latter substance apply to the oil, although the rapidity with which vapor is given off per square foot of surface is much less with the oil than with gasoline.

NOISE DUE TO OIL FIRE.

It has been observed with some steam-jet oil burners that the use by the burners of less than four per cent of the steam generated resulted in vibration of the flame, causing a disagreeable humming noise. No effect of this kind occurred in these tests when the steam used by the burner was only 3.1 per cent of the total generated. The noise from the fire was equivalent to that resulting from a moderate blowing off of steam from a safety-valve.

TABLE I.—RESUME OF TESTS.

Dimensions of Boiler: 6 feet diameter, 18 feet long, 100 tubes 2½ in. diameter, grate surface 45.5 sq. ft.	Beaumont Crude Oil.					No. 1. Buckwheat Coal.	
	Nov. 27	Night of Nov. 27-28	Nov. 28	Night of Nov. 28-29	Nov. 29	Dec. 12	Dec. 13
1	2	3	4	5	6	7	8
1. Duration, hours	3.5	8	11	13	11	12	12
2. Horsepower	146.9	112.7	189.7	138.0	220.1	92.6	119.1
3. Steam pressure (gauge) lbs	87	86	86	86	86.5	84.5	86.5
4. Feed temperature, degrees F.	69	90	70	90	74	68	72
4a. Chimney temperature, degrees F.	374	360	398	370	425	389	396
5. Quality of steam	Dry.	Dry.	Dry.	Dry.	Dry.	Dry.	Dry.
6. Moisture in coal	.....	.....	.....	.....	.....	6.2%	6.2%
7. Per cent. of ash	.....	.....	.....	.....	.....	16.2%	18.0%
8. Times fire was cleaned	.....	.....	.....	.....	.....	Once.	Twice.
9. Coal per hour per square foot of grate, lbs.	.....	.....	.....	.....	.....	7.66	10.10
10. Coal per hour per sq. ft. of heating surface, lbs.	.....	.....	.....	.....	.....	0.182	0.247
11. Oil per hour per sq. ft. of heating surface, lbs.	0.181	0.135	0.226	0.163	0.263	.....	.....
12. Dry steam per hour from and at 212 degrees per square foot of heating surface, lbs.	2.73	2.09	3.52	2.56	4.08	1.72	2.21
13. Heating surface per horsepower, sq. ft.	12.6	16.5	9.8	13.5	8.45	20.1	15.6
14. Total dry steam per lb. of fuel as fired from and at 212 degrees, lbs.	15.29	15.53	15.55	15.71	15.49	9.17	8.94
15. Per cent. of steam used by burner*	3.6%	3.1%	4.8%	3.5%	4.8%	.....	.....
16. Net lbs. of dry steam per lb. of fuel as fired from and at 212 degrees	14.74	15.05	14.80	15.16	14.75	9.17	8.94

*The steam used by the oil pump was a fraction of one-tenth of one per cent., and it is therefore not considered.

TABLE II.—DETAILED DATA AND RESULTS OF TWO PRINCIPAL TESTS.

Type of boiler	Horizontal return tubular.
Diameter of boiler	72 inches.
Length of tubes	18 feet.
Number of 2½ inch tubes	100.
Grate surface	6′ 6″ x 7′.
Height of chimney	70 feet.
Diameter of chimney	42 inches square.

KIND OF FUEL	Beaumont Crude Oil.	D. & H. No. 1 Buckwheat Coal.
1. Date of trial, 1901	November 29th.	December 13th.
2. Duration of trial hours	11	12
DIMENSIONS AND PROPORTIONS:		
3. Grate surface, sq. ft	45.5	45.5
4. Water heating surface, sq. ft.	1860	1860
5. Position of damper	Wide open.	Wide open.
6. Area of opening of ash-pit doors, sq. ft	1.8	5.5
AVERAGE PRESSURES:		
7. Steam pressure, by gauge, lbs	86.5	8.65
8. Draft pressure, inches of water	0.27	0.22
AVERAGE TEMPERATURES:		
9. Fire room, degrees Fahrenheit	53.1	71.8
10. Feed water entering boiler, degrees Fahrenheit	74.0	72.1
11. Chimney gases, degrees Fahrenheit	425	396
FUEL:		
12. Weight of fuel as fired, lbs	5393	5517
13. Percentage of moisture in fuel fired	....	6.2%
14. Percentage of ash and refuse in wet coal fired	....	18.0%
STEAM:		
15. Quality of steam	Dry.	Dry.
WATER:		
16. Total weight of water fed to boiler, lbs	70798	41717
17. Factor of evaporation	1.180	1.182
18. Equivalent water evaporated into dry steam from and at 212 degrees, lbs.	83542	49309
ECONOMIC RESULTS:		
19. Feed water per pound of fuel as fired, lbs	13.13	7.56
20. Equivalent evaporation from and at 212 degrees per lb. of fuel as fired, lbs.	15.49	8.94
21. Equivalent evaporation from and at 212 degrees per lb. of combustible, lbs.	15.49	11.79
EFFICIENCY:		
22. Efficiency of boiler and furnace, or heat per pound of fuel as fired, divided by calorific value per pound of fuel	78.5%	71.4%
22a. Efficiency of boiler, or heat absorbed by boiler per pound of combustible divided by calorific value per pound of combustible	78.5%	77.6%
HOURLY QUANTITIES:		
23. Fuel as fired per hour, lbs	490.3	459.7
24. Fuel as fired per hour per sq. ft. of grate, lbs	10.78	10.10
25. Combustible per hour per sq. ft. of heating surface, lbs.	0.263	0.188
HORSEPOWER:		
26. Horsepower at 34.5 lbs. from and at 212 degrees	220.1	119.1
27. Heating surface per horsepower, sq. ft	8.45	15.6
COMPOSITION OF FUEL:		
28. Carbon	85.03%***	77.5%**
29. Hydrogen	12.30%***	2.0%**
30. Oxygen and nitrogen	0.92%***	2.2%**
31. Sulphur	1.75%***	0.5%**
32. Ash	.....	11.6%
33. Moisture	.....	6.2%
	100.00%	100.0%
CHIMNEY GAS ANALYSIS:		
34. Carbonic acid C O_2	.....	7.6%
35. Oxygen O	.....	12.0%
36. Nitrogen N	.....	80.4%
37. Carbonic oxide C O	.....	0.0%
		100.0%
38. Pounds of chimney air per pound of carbon	.....	32.0%
39. Pounds of chimney air per pound of fuel as fired	20*	24.8

TABLE II.—CONTINUED.

		Beaumont Crude Oil.		D. & H. No. 1. Buckwheat Coal.	
	KIND OF FUEL				
	HEAT BALANCE ON WET COAL:	B. T. U.	Per Cent.	B. T. U.	Per Cent.
40.	Utilized in production of steam	14963	78.5	8636	71.4
41.	Evaporation of moisture in fuel and due combustion of hydrogen	1245	6.5	277	2.3
42.	Wasted in superheating water products	113	0.6	23	0.2
43.	Wasted in dry chimney gases	1837	9.7	1981	16.4
44.	Wasted in unconsumed carbon in ash	....	....	768	6.3
45.	Radiation and imperfect combustion	902	4.7	415	3.4
46.	Heat per lb. of fuel as fired, by calorimeter	19060	100.0	12100	100.0
47.	Heat per lb. of combustible, by calorimeter	19060		14680	

*Assumed as most probable amount.
**Assumed as most probable amount.
***This analysis is of a sample of oil from the Export Oil and Pipe Line Co.'s well, but not of a sample of the particular shipment used in the tests. It answers as well for the purposes of the Heat Balance as the analysis of a sample of the oil tested, which will be found elsewhere in this article.

TABLE III.—COMPARATIVE COSTS OF OIL AND COAL.

[1]Weight of oil per gallon = 7.66 lbs.
[1]Weight of oil per barrel of 42 U. S. gallons = 322 lbs.
[2]These figures are net evaporation after allowing for steam consumed to produce and used in the forced draft necessary for burning the fuel.
[3]By "wet coal" is meant coal containing 3% of water.

		Bituminous coals mined west of Ohio and in Western and South-western States.	Small Sizes of Anthracite. No. 3 Buckwh't or barley.	No. 2 Buckwh't or rice.	No. 1 Buckwh't and pea.	Pittsburg bitumin's used in mills of Pennsylvania and on Great Lakes.	Best Hand fired.	Semi-Bituminous. Atlantic Ocean traffic and mills of Eastern and Middle States. Mechani'l stokers & pat. furnaces introducing air over fire Ash 10%	Ash 5%
	1	2	3	4	5	6	7	8	9	10
1.	Pounds evaporation per lb. of wet[3] coal from and at 212 degrees, at about 10 square feet of heating surface per boiler horsepower	7.5	7.75[2]	8.25[2]	8.50[2]	8.75	9.50	10.00	10.50	11.00
2.	Pounds evaporation per lb. of Beaumont oil from and at 212 degrees, at about 10 square feet of heating surface per boiler horsepower	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8
3.	Ratio of evaporation of oil to coal = Line 2 ÷ Line 1 = R	1.97	1.91	1.79	1.74	1.69	1.56	1.48	1.41	1.35
4.	Number of barrels of oil equivalent to a 2,240-lb. ton of wet coal = 2,240 ÷ (322[1] R) = N	3.54	3.64	3.90	4.00	4.12	4.46	4.70	4.94	5.15
		Equivalent Price of Oil per Barrel of 42 U. S. Gallons = Pc ÷ N = Po.								
5.	Price of coal per ton of 2,240 lbs. Pc $1.00	$0.29	$0.28	$0.26	$0.25	$0.25	$0.23	$0.21	$0.20	$0.19
6.	1.50	0.43	0.41	0.39	0.38	0.36	0.34	0.32	0.30	0.29
7.	2.00	0.56	0.55	0.51	0.50	0.49	0.45	0.43	0.40	0.39
8.	2.50	0.71	0.69	0.64	0.62	0.60	0.56	0.53	0.50	0.49
9.	3.00	0.85	0.82	0.77	0.75	0.73	0.67	0.64	0.60	0.58
10.	3.50	0.99	0.96	0.90	0.87	0.85	0.78	0.75	0.71	0.68
11.	4.00	1.13	1.10	1.02	1.00	0.97	0.90	0.85	0.81	0.77
12.	4.50	1.28	1.23	1.16	1.13	1.09	1.01	0.96	0.91	0.87

EFFECT OF A SURPLUS OF OIL AT BURNERS.

It was suggested during the evaporative tests that the accidental opening of the oil valve of the burner, so as to cause a large excess of oil in proportion to the steam jet supply, was a source of danger, as it would cause some sort of explosion in the furnace.

The maximum draft of the chimney supplied only air enough for the perfect combustion of as much oil as corresponded to about one-half of the full opening of the oil valve. The oil valve of one burner was suddenly changed from this setting to wide open twice on the last day of the use of oil, and the only effect was to fill the furnace with thick smoke, no explosion or excess of pressure in the furnace occurring. The following experiment also affords similar conditions:

A red-hot rod of iron was inserted through a half-inch hole in the cover of a glass fruit jar half full of oil, so that about one inch of red hot iron was submerged in the oil, leaving two red hot inches out of the oil. The jar was instantly filled with a dense white vapor, which ignited, burned for a second, and then extinguished itself on account of the deficiency of air. There was no explosion, or excessive increase of pressure.

GOLD IN BURMA.—According to *Indian Engineering*, Mr. Jones, an old railway driver, is exploiting for gold in the Shwegyin subdivision of Lower Burma. The river sand has been washed for gold in the last 50 years. Mr. Jones has gone 25 miles above the town, and hopes to discover the source of the gold, or to work the river sand near it by machinery.

IRON AND STEEL EXPORTS OF GREAT BRITAIN.—The iron and steel exports of Great Britain for the year ending December 31 are valued by the Board of Trade returns as follows:

	1900.	1901.		Changes.
Iron and steel	£31,992,675	£25,305,673	D.	£6,687,002
Machinery	19,619,784	17,855,335	D.	1,764,449
New Ships	8,587,710	9,159,876	I.	572,166
Totals	£60,200,169	£52,320,884	D.	£7,879,285

The decreases shown were both in quantities and values. Almost the only single item in which there was any considerable gain was steel rails.

THE MINERAL PRODUCTION OF BRITISH COLUMBIA.

The preliminary report, prepared by Provincial Mineralogist W. F. Robertson, gives the estimated mineral production of British Columbia for 1901 as in the following table, the figures being compared with those of the completed report for the year 1900:

	1900. Quantity.	1900. Value.	1901. Quantity.	1901. Value.
Placer gold, ozs.	63,936	$1,278,724	43,204	$892,500
Lode gold..ozs.	167,153	3,453,381	227,696	4,704,200
Total gold..ozs.	231,089	$4,732,105	270,900	$5,596,700
Silver .....ozs.	3,958,175	2,309,200	4,685,718	2,624,002
Copper ....lbs.	9,997,080	1,615,289	30,736,798	4,951,698
Lead .....lbs.	63,358,621	2,691,887	50,529,260	1,970,641
Total metals ..	.....	$11,348,481	.....	$15,143,041
Coal .....tons.	1,439,595	4,318,785	1,529,210	4,587,630
Coke ....Tons.	85,149	425,745	134,760	673,800
Other m't'ls ..	.....	251,740	.....	309,030
Totals.....	.....	$16,344,751	.....	$20,713,501

The changes in values in 1901, as compared with 1900, are shown in the following table:

		Amount.	Per cent.
Placer gold	Dec.	$386,224	30.2
Lode gold	Inc.	1,250,819	36.2
Total gold	Inc.	$864,595	18.3
Silver	Inc.	314,802	13.6
Copper	Inc.	3,336,409	206.6
Lead	Dec.	721,246	26.8
Total metals	Inc.	$3,794,560	33.4
Coal	Inc.	268,845	6.2
Coke	Inc.	248,055	58.2
Other substances	Inc.	57,290	22.7
Total	Inc.	$4,368,750	26.7

The following table gives the value of the production by districts and mining divisions:

Name.	Divisions. 1900.	Divisions. 1901.	Districts. 1900.	Districts. 1901.
Cariboo District	.....	.....	$684,527	$470,000
Cariboo and Quesnel Div.	$672,000	$450,000	.....	.....
Omineca Div.	12,527	20,000	.....	.....
Cassiar District	.....	.....	467,479	320,000
Kootenay, E., Dist.	.....	.....	2,855,851	2,850,289
Kootenay, W., Dist.	.....	.....	6,020,783	7,362,189
Trail Creek Div.	2,739,300	3,855,556	.....	.....
Nelson Div.	787,082	1,110,226	.....	.....
Ainsworth & Slocan Div.	2,413,373	2,240,615	.....	.....
Other parts	81,028	155,792	.....	.....
Lillooet District	.....	.....	88,493	56,900
Yale District	.....	.....	1,422,465	4,751,458
Grand Forks and Kettle R'v'r Div.	1,358,383	4,695,469	.....	.....
Other Divisions	64,082	55,989	.....	.....
Coast Districts	.....	.....	4,805,153	4,902,665
Totals	.....	.....	$16,344,751	$20,713,501

The large increases were in the West Kootenay and Yale districts; the Trail Creek and Nelson divisions in the first named district showing the larger gains. Mr. Robertson sums up as follows:

"The estimate for 1901 is based upon the actual returns of a number of the mines, and for those mines from which returns have not as yet been received the output is based upon their approximate known tonnage for the past year, together with the assays of the ores from the same mines for the previous year. These are not given as final statistics for the year, which can only be obtained after all returns are in and checked very carefully. These will be included in the *Annual Report* of the Department, which cannot be out for about two months yet. I give these figures now rather than wait for the final statistics, as I believe the prompt publication of even an approximate official estimate making so good a showing will be of benefit to the Province, and is generally desired by investors in our mines. I think this estimate will be found conservative and very approximate, quite sufficiently so to show the progress which has been made in the mining industry during the past year.

"In calculating the values of the products the usual course has been followed, and the average price for the year in the New York metal market has been used as a basis. For silver 95 per cent and for lead 90 per cent, of such market price has been taken. Treatment and other charges have not been deducted. Roughly speaking, the increase made in 1901 over 1900 is 25 per cent on gross value of output of the Province. This will be a very agreeable surprise to many, as the circulation of reports giving a contrary impression has caused a very despondent view to be taken of the progress of the mining industry during 1901, which does not seem to be warranted by the facts.

"There is an appreciable drop in the placer gold production, owing to the sudden melting of the snow last spring causing freshets and leaving a shortage of water during the latter part of the season. The tonnage of ore mined from the lode mines in the past year is about 871,832 tons, equal to an increase of 317,036 over the year 1900, a little more than 57 per cent. There has been an increase in the output of all the metals with the exception of lead, the low price obtainable in this Province for lead ores having discouraged this class of mining, except where accompanied with good silver values. The gross value of the copper output has increased 206 per cent over 1900, while lode gold has increased 36 per cent and silver 14 per cent."

BRITISH RAIL EXPORTS.—Exports of steel rails from Great Britain in the year 1901 were 574,656 tons, against 463,731 tons in 1900, showing an increase last year of 110,925 tons, or 23.9 per cent. This is in marked contrast to the exports of other iron and steel products.

IRON ORE IMPORTS IN GREAT BRITAIN.—Imports of iron ore into Great Britain for the year ending December 31 are reported as below, in long tons:

	1900.	1901.		Changes.
Spain	5,551,559	4,747,890	D.	803,669
Other countries	746,404	798,955	I.	52,551
Totals	6,297,963	5,546,845	D.	751,118

The other countries include Sweden, Norway, Algeria, Greece and Newfoundland.

MINING METHODS IN THE NEW YORK SUBWAY.

BY D. H. NEWLAND.

The New York Subway, which will afford rapid transit between the remote parts of Manhattan Island, and the proposed tunnel under the North and East rivers, furnishing direct railway communication with New Jersey and Long Island, is of considerable interest to the mining world. Not only are the methods adopted in undertakings of this kind quite similar to the methods used by large mining enterprises, but the mechanical devices are such as may be found in the modern mining regions of the West and in foreign countries. Moreover, the construction work affords an extensive market for mineral products in the form of iron and steel, brick, cement, stone and asphalt.

The subway, after a period of about sixteen months' actual work, is now in an advanced stage of development. Power plants are installed along most of the sections into which the route was originally divided for contract, while machinery for excavating, hoisting, conveying and other purposes is being put to use by large gangs of workmen. Some stretches of the tunnel are already completed, so that opportunity is afforded to observe all the steps of progress, from unbroken ground to the finished structure.

The general plan of the tunnel as adopted by the Rapid Transit Commission calls for a shallow excavation following the surface as closely as the variations in the topography and other conditions will permit. While the difficulties attending the construction upon this plan are undoubtedly greater than if the tunnel were driven at such depths as to pass beneath the sewers, pipes, mains and other sub-surface obstructions, thus at the same time avoiding interference with street traffic, the usefulness of the subway would have been greatly curtailed for the reason that the short-distance travel could not be easily provided for. The expense of operation would also be much greater, inasmuch as elevators would be required at the stations for the convenience of the public.

According to the plans adopted the subway will have an underground length of about 15 miles. The total amount of material to be excavated has been estimated by the engineers at about 2,990,000 cubic yards, of which 1,700,000 cubic yards are earth. Of the 1,290,000 cubic yards of rock somewhat less than one-third is to be removed by tunneling.

At the southern terminus of the subway in Park Row near the Post Office (to be extended later under the East River to Brooklyn), the natural conditions offer few obstacles to the construction. The material to be removed consists of strata of loose sands and gravels with few large boulders, evidently glacial material, while the floor level of the completed subway is only some 40 ft. below the street. Under these circumstances the work can be done to best advantage by open cut methods.

The loose earth is removed by pick and shovel and hoisted to the surface by boom derricks and by a Lidgerwood cableway and hoisting engine. The latter apparatus is made by the Lidgerwood Manufacturing Company, of New York, which has supplied nine cableways and engines for the subway construction, besides the engines for the Carson trenching machine, a similar type of cableway, but of lighter construction. The cableways are designed for spans of from 250 to 450 feet and are supported by four-post towers and A frames 45 feet in height. Their lifting and carrying capacity is about three tons. The engines have 9-in. by 10-in. cylinders, double-tandem drums and are of 35 horse power each. Connected with each engine is an air receiver and reservoir in the form of a 45 horse-power boiler of ordinary vertical pattern. Hoisting and conveying plants of similar type find wide application in the mining industry and are recognized as economical and effective.

The difficulties encountered here, as at many other places along the route, arise for the most part from the provisions that must be made to accommodate the heavy traffic on the street. To avoid interrupting the traffic the following plan has been adopted: Work is begun at each side of the roadway by excavating narrow trenches, which, when a sufficient depth is reached, are connected by cross-trenches. Large wooden timbers or needles are then placed horizontally in the latter, extending from side to side of the street, and are supported by blocking set upon the unexcavated ground. After the roadway is thus supported vertical shafts are carried down to the level of the tunnel, and posts are erected to carry the needles. The earth is then removed along both of the longitudinal trenches, working gradually toward the center until the excavation is completed. Additional posts are set up beneath the needles as they may be required. The sides of the open cut are supported by sheeting-plank placed ver-

ARCHED TUNNEL IN NEW YORK SUBWAY.

tically and driven down as the work progresses in depth. The planks are held in line by horizontal beams laid parallel to the course of the subway, and these in turn are kept in place by cross-pieces and wedges.

This method of excavation is applied to other sections of the route when the natural conditions are similar, being modified in particular instances as to some details. Such portions as require no provision for accommodating overhead traffic may be opened through the whole width of the subway at once. On the other hand, when the street is narrow, a single side trench is dug and the tunnel completed from this as a basis of operations.

Compressed air for operating the hoisting and conveying engines along the lower portions of the tunnel is supplied by two 24 by 24 by 30-in. straight line Ingersoll-Sergeant, Class A compressors. Each compressor is designed for a speed of 80 r. p. m. with a capacity of 1,225 cubic feet piston displacement, or 15,314 cubic feet per revolution. The dimensions of the compressors are 22 feet by 6 feet by 6 feet and the weight 32,000 pounds. There are four power plants on the line of the subway using this type of compressor.

In Union Square at Fifteenth Street, and extending for a considerable distance north, the line of the subway lies in solid rock, a mica schist of Hudson River age. Here the excavation is commenced by drilling and blasting the rock along the western side to grade level; the cut thus made is afterward widened to the full dimensions of the subway. No timbering is required except to support the roadway. Blasting must be conducted with great care and light charges of explosive are used in shallow holes. Usually no more than two or three holes are fired at one time. The drills are the Ingersoll-Sergeant pneumatic type with tripod mountings.

Further north, on Park avenue, between Thirty-third and Forty-second streets, the method of deep tunneling has been adopted, as near the surface from Thirty-fourth to Fortieth street a large tunnel already exists which is used by the street railways. The plans call for two tunnels below the existing one, to be located on either side of the latter's central line. They are being excavated by means of two shafts near the end of the section, and sunk to the floor of the subway. From these stations the work of drilling and blasting is begun.

An interesting test of the relative value of the two methods generally adopted in this work has been carried out in driving the tunnels. The top-heading method, which is that used in this country almost exclusively, has been tried in the west tunnel, while the bottom-heading favored by foreign engineers for excavating homogeneous material, was applied to the east tunnel. In bottom-heading, the plan followed has been to excavate a section 8 feet wide, 10 feet high and 7 feet deep at the base, and to one side of the center of the tunnel. On each side of the drift two more panels uniform in height with the first, but somewhat narrower are carried forward and then, some 50 feet in the rear, work is begun on the fourth bottom section, thus carrying the tunnel to the required width. About 50 feet behind the fourth cutting, excavation begins on the overlying rock, which is removed in one face, clearing the whole subway. By the top-heading methods, which resemble underhand-stoping, the upper part of the tunnel is first excavated in four sections, similar in form to those described, and later the underlying rock is taken out. In both methods work on the headings begins by first cutting a central wedge of the same height as the face.

Tracks are laid from the shaft along the floor of the tunnels to a point near the headings, and the broken rock is loaded into boxes. When filled the boxes are transported on platform cars to the shafts and hoisted by derricks.

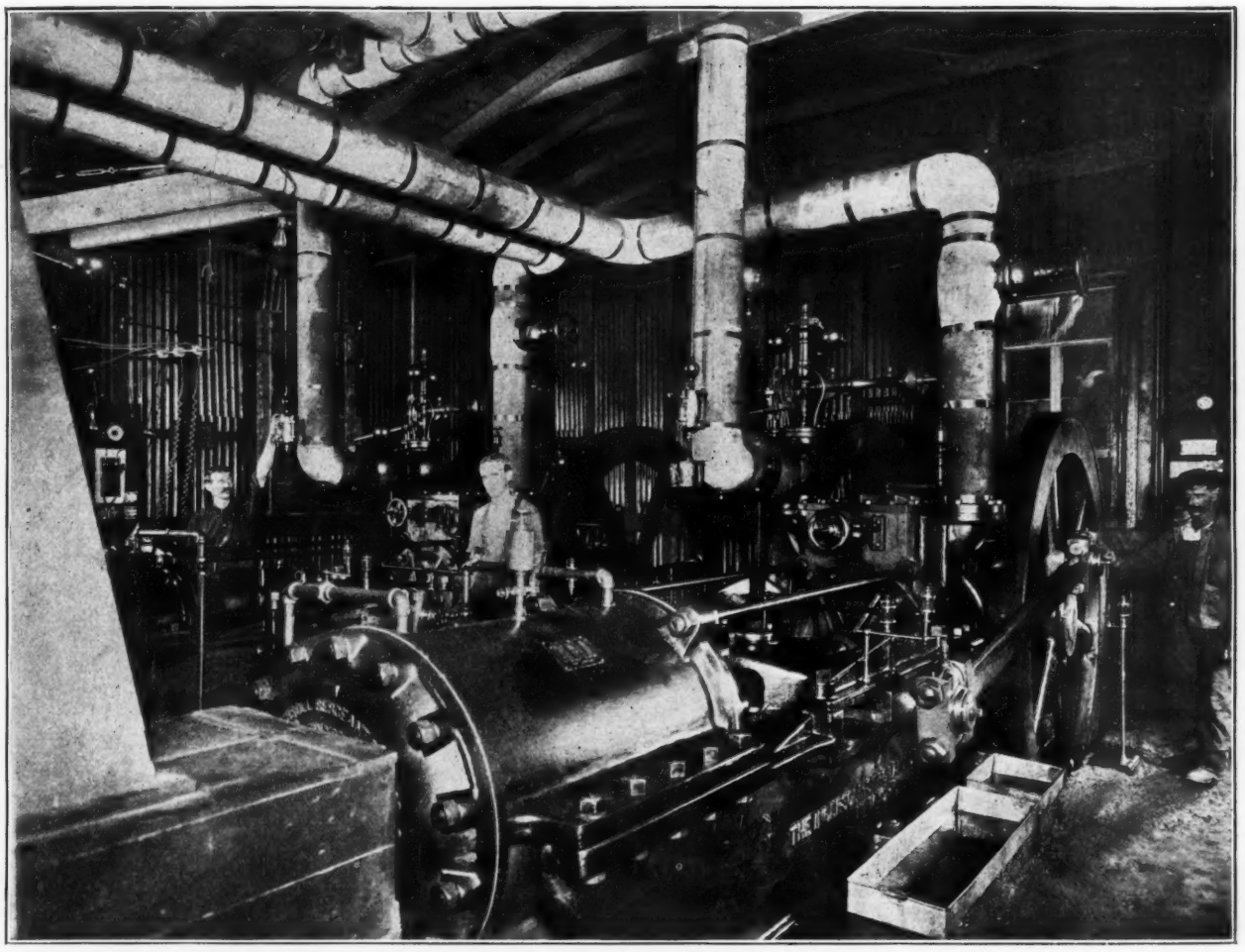
So far as expense is concerned the bottom-heading method has been found the more economical, owing to the fact that the tracks can be laid close to the working faces and the broken material removed with less labor. The rock is schistose in character, with vertical cleavage planes running almost parallel to the tunnel, hence the roof has to be carefully supported to prevent slips. Temporary support is given by struts and posts, but as soon as a section is completely excavated these are removed and supplanted by bents of timbers with lagging. Each bent consists of a cap 12 by 12 inches and 15 feet long, supported by two legs of 12 by 12-in. stuff studded on sleepers. The latter are carried in bearings cut in the solid rock of the sidewalk. The cap is braced also by timbers in the form of an arch, with a key-piece starting from the sills. Work is carried on continuously in eight-hour shifts, and the rate of progress is slow, averaging about 3 feet a day.

The drills used in the tunnels are of the percussion type, and are usually mounted in pairs on columns, working horizontally; tripod mountings are adopted when there is sufficient working room. Compressed air for driving engines, drills, riveters, etc., is furnished by a Rand-Corliss cross-compound compressor, with condensing cylinders having a capacity of 4,400 cubic feet at nominal speed. It is fed by two horizontal water-tube boilers with 4,000 square feet heating surface. This plant, which is located at a distance of 4,000 feet from the nearest workings, supplies power for nearly 1 1-2 miles of the route.

From Park Avenue across Forty-second Street to Broadway, open cutting is again resorted to by the side trench method. The material excavated consists of upper strata of loose gravel and clay, resting upon decomposed rock, with hard schist underlying. The latter is called "blue trap" by the drillers, perhaps from the similarity in color to the trap rock of the Palisades. It possesses a marked degree of cleavage, notwithstanding which it is exceedingly tough and can be broken only with difficulty. Blasting has to be conducted with caution owing to the nearness of the buildings; the explosive force of the charges is smothered as much as possible by placing matting over the holes before firing. The excavations are strongly timbered and although the work is carried up almost to the foundation line of the buildings on the street none of them have been damaged in the least.

North of Forty-second Street, for a distance of nearly 2 miles along Broadway, the grade is flat and the natural conditions offer few difficulties. For much of the distance the excavation is by the center cut method, which consists in opening a trench along the central line of the route and widening it as soon as grade level is reached. There is great variability from place to place in the character of the material encountered, hard schist, decomposed rock, sand and gravels alternating in brief distances. Pneumatic drills are used whenever the rock requires blasting, and are run generally by a single operator. A portion of the rock taken out is broken for concrete in a Gates crusher, manufactured by the Allis-Chalmers Company.

For mixing the concrete a gravity apparatus has been adopted, which, on account of its simplicity, is deserving of mention. It consists of an inclined sheet iron or steel trough, rectangular in section, rigged with hard steel baffle plates. The sand, stone and cement are shovelled in proper proportions into the top of the trough, and striking against the baffle plates in their descent, are thoroughly mixed. Water is introduced by means of a pipe at the top. The route of the subway throughout the section is paralleled by two car tracks which require support



INGERSOLL-SERGEANT AIR COMPRESSORS USED FOR NEW YORK SUBWAY

as the excavation proceeds. An ingenious device for this purpose takes the form of a heavy wooden truss, to the bottom chord of which are bolted needles placed at frequent intervals beneath the roadway. The ends of the trusses rest upon cribbing or heavy posts, the latter reaching to the grade of the subway. As soon as the excavation and steel work are completed beneath a pair of trusses the needles are loosened and the trusses carried forward on rollers to a new position, where they are again brought into use. By this means an economy is effected both in timbering and labor, while the roadway is so firmly supported that the asphalt covering rarely shows signs of cracking, notwithstanding the constant strain exerted by passing cars.

Power for this section is supplied by two 24 by 30-in. Rand compressors with a capacity of 2,700 cubic feet. They are driven by four horizontal boilers of 600 aggregate horse-power. The air feed-pipe is laid directly on the surface. The drills in operation on this part of the subway were furnished by the Rand Drill Company and are of the usual percussion type mounted on tripods. This company alone has supplied about 175 drills for the tunnel work.

An apparatus that is unique of its kind so far as relates to the present work on the subway, is an electric hoisting and conveying machine located between One Hundred and Eleventh and One Hundred and Twelfth Streets. It consists of a 2-in. wire cable supported by A frames the legs of which are placed on the ground. The frames are inclined at an angle of about 45 deg. from the vertical and away from the cable, the tension of the latter being taken up by counter-weights of stone, attached like scale-pans to the peak of the frames. A crab driven by electricity taken from trolley wires travels on the cable, and is guided by a man who rides upon it. The spoil is hoisted in steel buckets and conveyed to either end of the cableway for dumping. Owing to the effect of the counterweights the frames rise and fall as the car moves toward or away from the center, thus assisting its progress. The length of the cable is 560 feet. It is stated that the cost of handling material by this apparatus is about 2 cents per cubic yard.

The deepest excavation for the subway is being made on the northern portion, between One Hundred and Fifty-seventh Street and Fort George. The work is carried on entirely by tunneling, with shafts at One Hundred and Sixty-eighth and One Hundred and Eighty-first Streets, and an open cut at One Hundred and Sixty-first Street, for entry and removal of the spoil. The One Hundred and Sixty-eighth Street shaft is about 100 feet deep and has a rectangular section measuring 15 by 32 feet, being rigged for running two cages in balance. The hoisting power is a Lidgerwood engine. Cables pass from the drums of the engine over sheaves to the top of the framework to be attached to the cages. At present the length of the completed subway is about 900 feet. The top-heading method of driving has been adopted, while the work of breaking down the rock is done by pneumatic drills and blasting. The spoil is loaded into wooden cars, holding about three-quarters of a cubic yard, which are run over iron rails to the shaft and thence on to the cage. At the surface the rock is dumped from a platform into Western side dump cars and hauled by Porter steam engines to the spoil-heaps. The rock in which the cut is being made is the same mica schist found along the lower portion of the route, but has a slightly more massive appearance. Small dikes of pegmatite are frequently intercolated between the planes of schistosity. The latter are inclined at a slight angle from the vertical and strike about parallel to the route of the tunnel. The roof is usually firm, requiring no support except at a point near One Hundred and Fifty-seventh street, where the rock has been disintegrated by weathering. This place is timbered with 10 by 10-in. sticks, set in the form of an arch of seven segments. In this connection mention should be made, however, of a serious fall of rock that occurred some time ago in the south entry at One Hundred and Sixty-eighth Street. According to Mr. T. P. Kinsley, the engineer in charge of this section, the roof had been tested shortly before the accident and apparently was as firm as at any other point. The fall came suddenly and without warning. It is thought that the fall may have been due to a cross-fissure located at such a distance from the line of excavations that the hammer-testing failed to reveal its presence. As already stated, the planes of cleavage, or schistosity, are parallel to the line of excavation and slightly inclined from the vertical, so that a well marked fissure cutting across the plane would leave a rock mass at the shoulder unsupported. Hydraulic pressure due to the backing up of a column of water along the joint faces may possibly have been influential in giving an in-

OPEN CUT WORK ON NEW YORK SUBWAY.

itial impetus to the mass. As the overlying rock is nearly 100 feet thick, it will be seen that a heavy pressure might be developed in this manner.

The tunnel is remarkably dry and requires little pumping. A single pump near the shafts, from which a small pump works intermittently, suffices to remove the water. Incandescent lamps are used for lighting. Thus far no provisions for artificial ventilation have been thought necessary. The progress of the excavation from each shaft ranges from 80 to 100 feet per month. About 350 men are employed underground, working in two day shifts and one night shift of eight hours each. The latter attends to the repair work on drills, moves the railways, extends the lighting system and does most of the blasing. Owing to the depth of the tunnel in this section large charges of dynamite can be used with safety. The explosives are furnished by the Climax Powder Company, of Pittsburg and New York. Power for running the drills, etc., is supplied by three straight-line compressors with a capacity of 4,000 cubic feet.

The only dredging machine at work on the subway is located at One Hundred and Forty-second Street. The material met with here is sand and clay, which can be excavated economically by this apparatus. The bucket used is of the orange-peel type, and is operated by a boom derrick, the cut made being about 30 feet deep, while the width is 103 feet, much more than normal, the extra space being required for car-storage yards.

While the structure of the subway as completed is rather outside the limits of this paper, a few details as to the materials used and their arrangement will serve to explain the general character of the entire construction.

Three types of section have been adopted, the rectangular, the arch and the circular, of which the first-mentioned is used in the portion excavated by open-cutting where the depth is not excessive, the second in tunnels and the last under the Harlem River. The rectangular section of the subway, where four-tracked, is 50 feet wide by 13 feet high, and the arch section is 25 feet wide at the base and 18 feet high at the crown.

The rectangular section is lined with concrete carried by a framework of steel in bents. Each bent consists of I columns next the wall and H columns on the inside, connected by transverse I-beams. Overhead the beams carry on their flanges a concrete roof. The floor is composed of two layers of concrete with an intervening layer of asphalt as waterproofing. Stone pedestals are set in the floor for carrying the steel columns and track supports. The vault or arch type of tunnel is built of concrete containing about 6 cubic yards of this material per lineal foot. In constructing the side walls, molds faced across from side to side are used, while the roof is held in place by wooden centers consisting of lagging fastened to radially-braced cross-frames. The concrete is built up step by step.

The steel required for the permanent structure of the subway, amounting to 65,000 tons, is being supplied by the Carnegie Works, of the United States Steel Corporation, while the American Bridge Company has the contract for the materials to be used in the elevated portion.

The vastness of such an undertaking as the subway is well illustrated by the contractors' pay-rolls for labor and material, which amount to nearly $1,000,000 a month. Thus far about $12,000,000 have been expended, and the work, according to the engineers' estimates, is a little more than one-third completed.

The worst accident in connection with the construction of the subway occurred on Monday of the present week when a large quantity of dynamite, stored in a shanty at the north end of the Fourth Avenue section, exploded with terrific force killing six people, injuring many others and doing thousands of dollars worth of damage to the tunnel work and to adjacent property. The explosion occurred at the top of the 50-foot shaft at 41st street and Fourth avenue. Much greater loss of life would have been recorded but for the fact that the explosion occurred during the noon hour.

THE SNOW SHOE AND BROAD TOP COAL FIELDS.*

By Roger Hampson.

The Snow Shoe Coal Basin is located in the northern portion of Center County, Pa., and is one of the detached coal basins lying in the First Bituminous District. It is about four miles in length by three in breadth and was one of the first coal-fields that was opened in this part of the State, and for a number of years the production of coal was not large. It was only when the Berwind-White Coal Mining Company got hold of the property that large shipments were made, and the coal field properly developed. About 1882 the Lehigh Valley Coal Company purchased the interests of the Berwind-White Company and has been the largest producer since that time. They control most of the territory at the present time, and the shipments by this company since they took possession will have averaged at least 400,000 tons per annum. In addition to this company there are two other companies operating here, the Snow Shoe Mining Company and Kelly Brothers, and the production of coal will now amount

CABLE TRAMWAY IN USE ON NEW YORK SUBWAY.

to about 600,000 tons per annum. All this coal finds an outlet to market over the Pennsylvania Railroad.

The veins of coal worked here are beds "B" and "D". The former runs in thickness from 3 1-2 to 4 feet, with a band of bone in the center and has usually a good slate roof and fire-clay floor. Bed "D," which is on top of the hills, runs from 5 to 6 1-2 feet in thickness, with a band of bone on the center with a friable slate roof and fire-clay floor. The coals are good for steam purposes, and years ago a good quality of coke was made from the fine coal after screening; but of late years this had not been done.

The method of working the mines is by room and pillar. Rooms are driven from 21 to 24 feet in width and pillars about 15 feet wide. The pillars are recovered as soon as possible after the rooms are worked to their destination.

The Broad Top Coal Field, roughly speaking, covers an area about 8 miles by 8 miles and is located in parts of three counties, Huntington, Bedford and Fulton. The coal finds an outlet to market by way of Huntington & Broad Top Railroad, to Huntington, where it strikes the main line of the Pennsylvania Railroad, and the East Broad Top Railroad to Mount Union, where it also connects with the Pennsylvania Railroad. This coal basin is an isolated one, lying between the anthracite fields and the bituminous. Its characteristics differ from both bituminous and anthracite in the fact that the coal is of a dense structure, very bright and lies in slips at an angle of about 50 deg.

The field has been the scene of great disturbances as it crossed many deep and narrow basins. The greatest disturbance has been in the western central portion. At the eastern end of the basin the basins are not so deep nor so much troubled with faults and rolls as in the other sections of the field. Owing to the unevenness of this coal field we have drift, slope and shaft mines. Taking the central portion of the field as an example: Starting at Riddlesburg, and traveling up Six Mile Run in an easterly direction we come to the following basins: Mount Equity, Browns, Duval, Harvey Slope, Wigton's, New Hampshire, Scotts and North Point, and from this latter basin the country is an unknown one until we reach Robertsdale, where we find the basins flattened out.

When this region was first developed a mine was opened on a small patch of the Pittsburg vein lying on a small elevated peak between Six Mile Run and Shoups Run. This coal was hauled by wagon to Riddlesburg and then floated down the Raystown branch of the Juniata to Huntington, but the coal was not very good and the seam was intermixed with rubbish. It was abandoned and attention was turned to the seams in the lower coal measures, and at the present time the seams being worked are "A", "B" and "D", or as named in the region, the Fulton, Barnet and Kelly. On Shoups Run the seams being worked are the Fulton and Barnet, the coal running from 2 to 3 feet in thickness with a fire-clay roof and sandstone floor in the Fulton and with a sandstone roof and floor in the Barnet.

On Six Mile Run the Barnet is worked with a sandstone roof and floor and the Kelly, on Sandy and Long Runs, is also being worked with sandstone roof and floor. The method of working followed here is, if possible, to get to the bottom of the basin and then strike headings across the pitch, turn rooms from these headings and run the rooms from 30 to 45 feet in width with roadway in the center. Pillars, as a rule, are left, as on account of the roof being so hard and having to be shot down to get cars in, no attempt at the recovery of the pillars is made.

At Robertsdale, the seams are different, there being in the Barnet seam a rock parting which runs from 6 inches to 16 feet. Here a different plan is followed, in that the rooms are worked about 40 feet in width and driven up the required distance, the props are shot or chopped out and the rock coal allowed to fall; then the road is again laid in and the coal recovered from above the rock.

*Paper read before the Western Pennsylvania Central Mining Institute, Pittsburg, Pa., December 19, 1901.

ILLINOIS COAL OUTPUT INCREASED.

The annual report on the coal mining industry of the State of Illinois covering the fiscal year ending June 30, 1901, which is now in course of preparation by the State Bureau of Labor Statistics, will show the production of the year to exceed that of any corresponding period in the mining history of the State. The total output of all mines last year was 26,635,819 tons, exceeding by 1,481,390 tons the production of the preceding year, which was by far the largest single year's production up to the present time. The increase is the more notable because of the shortening by two hours of the work day in every mine in the State.

Along with the increased production, the report shows the average value of the product to be larger than ever before. The average value per ton of all grades of coal at the mine last year was $0.9543, while in the prosperous preceding year it was only $0.8949. The aggregate home value of the product of 1901 exceeds by $2,889,318 that of the preceding year.

The report will show that machine mining has gained little in favor over hand mining in the last year. One year ago sixty-seven mines were operating 430 machines. Now sixty-three mines are operating 464 machines, the increase in machine production for the year being only 191,045 tons.

A satisfactory showing is made in the matter of wages. The average price paid per gross ton for mining the last year was $0.564, as against $0.4931

the year before. For machine mining, the average price paid per ton last year was $0.4125, as against $0.3578 the preceding year. The average number of miners employed last year shows an increase of 2,954, and the number of accidental deaths exceeds that of the previous year by seven.

The following general summary, compiled from the reports of the various district mine inspectors, presents the totals for the State:

Number of counties producing coal	53
Number of mines and openings of all kinds	915
New mines or old mines reopened during the year	133
Mines closed or abandoned since last report	143
Total output of all mines, in tons of 2,000 pounds	26,635,319
Number of shipping mines	319
Total output of shipping mines, tons	24,947,901
Number of mines in local trade only	596
Output of local mines	1,637,418
Total tons of lump coal	13,321,124
Total tons of other grades	13,314,195
Total tons shipped	22,556,527
Tons supplied to locomotives at the mines	946,692
Tons sold to local trade	2,007,167
Tons consumed or wasted at the plants	1,124,933
Average days of active operation for shipping mines	204.7
Average days of active operation for all mines	174.3
Average value per ton, all grades at the mines	$0.9543
Average value for lump coal at the mines	$1.181
Average value per ton of other grades	$0.7316
Aggregate home value of total product	$25,418,983
Number of mines in which mining machinery are used	63
Number of mining machines in use	464
Number of tons undercut by machines	5,774,639
Number of tons mined by hand	20,860,680
Average number of miners employed during the year	30,829
Average number of all employes	44,143
Number of men at work underground	39,750
Number of men at work on surface	4,393
Average price paid per ton for hand mining	$0,5640
Average price paid per ton for machine mining	$0.4125
Number of kegs of blasting powder used	551,034

As to accidents the report gives the number of men killed and of those so seriously hurt as to lose a month's work or more, as follows:

	Killed.	Injured.	Total.
Total number	101	422	523
Number per 1,000 employes	2.29	9.56	11.85
Tons mined per casualty	263,716	63,117	50,928

The men killed left 55 widows and 139 minor children. The average coal mined per employe was 603 tons.

There were 415 mines using steam boilers, and the total number of boilers employed at mines was 1,150.

THE WESTERN KENTUCKY COAL FIELD IN 1901.

By C. J. Norwood.

The indications are that, in consequence of shortage in railroad car service during the spring and summer, especially on the Illinois Central—one of the two principal roads of the field—the production of the Western Field in 1901 will show a gain of only 60,000 to 70,000 tons over the output for 1900. The December output, moreover, was curtailed by an extraordinary cold snap and much snow just before Christmas, which interfered with daily shipments and cut down the usual stocking of coal on mine yards preparatory for the holiday demoralization.

Except in the case of three of the smaller mines, the disturbances arising from the efforts of the United Mine Workers of America to overcome the non-union system that prevails in the contiguous counties of Hopkins, Christian and Webster had little effect on the output of the 16 mines concerned. Christian county (one mine) shows a shortage of nearly 11,000 tons, the larger part of which may be attributed to the reign of terror at Empire resulting from the efforts of lawless characters, who lay in ambush, seeking to close the mine by means of assassinations. One mine in Webster and one in Hopkins also show shortages, in part due to the same cause. But as a whole, the tonnage of these counties was affected by the poor car service, and not by the efforts to unionize the mines. Mines supplied by the Louisville & Nashville Railroad, were fairly well served, and increased their output, while those on the Illinois Central fell short. Webster County, supplied by the Louisville & Nashville, shows a gain over 1900, despite the loss at one of the Providence mines. Hopkins County shows a loss of about 7,000 tons, due to shortage of cars on the Illinois Central road. The mines on the Louisville & Nashville show a gain of 56,000 tons, while the three on the Illinois Central lost about 63,000 tons. The most significant gains were at the Reinecke and Oak Hill mines, the former showing an increase of 18,000 tons, and the latter an increase of 12,000. These mines were storm centers during the most violent times.

The effect of car shortage is well shown by a comparison of the two leading counties of the field:

		Tons.
Hopkins County (Non-Union)—		
Louisville & Nashville mines	gain	56,085
Illinois Central mines	loss	63,806
Total	loss	7,721
Ohio County (Union)—		Tons.
Illinois Central mines	loss	43,977

No mines on Louisville & Nashville road.

In Muhlenberg County (union) similar results are shown, Louisville & Nashville mines gaining and Illinois Central mines losing.

During the year there were no strikes of importance in the field, though there were a number of small stoppages for adjustment of disagreements in some of the "union" counties, which curtailed the output to a slight extent.

Omitting McLean County, for which I can offer no figures—the probability being, however, that its output did not exceed, if it equalled, that for 1900—the output of the various counties was about as follows:

	Short Tons.
Butler	22,911
Christian	71,758
Davies	16,036
Hancock	8,000
Henderson	152,410
Hopkins	1,346,019
Muhlenberg	475,000
Ohio	507,000
Union	252,000
Webster	107,202
Total	2,959,676

The same counties in 1900 produced 2,902,182 tons, a gain of 57,494 tons for 1901. McLean County (omitted from above) produced 31,316 tons in 1900.

Prices throughout the field were about the same as in 1900, in some instances slightly higher and in others somewhat lower.

CO-OPERATIVE TOPOGRAPHIC SURVEY OF OHIO.

The Ohio State Legislature, at its session of 1900, passed an act providing for a topographic survey and map of the State in co-operation with the United States Geological Survey, and appropriated $25,000 for that purpose on the condition that the federal organization should expend an equal amount on the same work. Field work was accordingly begun in March, 1901, and was prosecuted without interruption until the end of the field season in November. The result of this work was the mapping of 18 quadrangles, embracing parts of 24 counties, mostly in the northern section of the State, covering an area of 4,370 square miles. In addition to the topographic mapping which was completed, an additional area of 14,000 square miles was covered in the location of points by primary triangulation and traverse, as a basis for future topographic mapping. Ohio has an area of 41,060 square miles. The topographic map of the State will be published in the form of 200 atlas sheets. Each map sheet is approximately 16½ by 20 inches, and represents the topography of about 230 square miles, the area varying slightly with the latitude. The scale is about 1 mile to 1 inch, and the differences of altitude are shown by contour lines or lines of equal elevation. Each sheet is engraved on copper and printed in three colors; black for the lettering and artificial features, as roads, railroads, houses, etc.; blue for all water features, as lakes and rivers; and brown for contour lines representing the relief, heights, shape and slopes of hills and valleys.

EMERY IN GREECE AND TURKEY.

Consular Report.

The Island of Naxos, embraced in the Greek Archipelago, is situated about 100 miles southeast of the Piræus. Its inhabitants are supported almost entirely by working the emery mines, of which there are two. The Greek Government is the owner and proprietor of these mines, but they are worked exclusively by the natives of the island. The Government has entire charge of the sale of the ore and buys the crude product from the Naxos miners at 2½ francs (48 cents) per hundredweight of 112 pounds. The ore is transported to the neighboring Island of Syra at Government expense, and is there sold on the wharf at 106½ francs ($20.55) per French ton of 1,000 kilograms (2,204.6 pounds). Two years ago, an American company attempted to secure a monopoly of the industry and made an offer to the Greek Government to buy 7,000 tons per year for ten years at 106½ francs ($20.55) per ton, but for some reason the arrangement fell through. The total annual consumption of Naxos emery is from 5,000 to 6,500 tons. Of this, the United States takes 1,500 to 2,000 tons, and Europe from 4,000 to 5,000 tons. The Naxos mines have never been leased.

Turkey has many emery mines scattered along the coast of the Mediterranean and near-by islands. Those of importance in the neighborhood of Smyrna are at Baltizik, Azizieh, Cosbounar, and Kuluk. Some of the Turkish mines are the property of the Turkish Government, but many of them are owned and operated by local companies and by single individuals. The total annual exports of Smyrna emery range from 17,000 to 20,000 tons, of which 10,000 tons go to America and the balance to Europe. The corundum found in the Turkish emery varies from 40 to 57 per cent, with the exception of Kuluk ore, which is said to contain about 37 per cent. Corundum in the Naxos emery is reputed to run as high as 60 per cent. The prices of Smyrna emery vary with the quality from $14 to $20 per ton, f. o. b. Smyrna. It is creditably stated that no emery can be produced f. o. b. Smyrna for less than $12.50. The Kuluk emery is shipped from the port of Kuluk, and is brought down from the neighboring mountains by camels. This ore is quoted f. o. b. Kuluk at $10 to $12 per ton.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Specially Reported.

Law Liberally Construed to Prevent Forfeiture.—Where a valid location of a mining claim has been made, and work done thereon in good faith, possession maintained, and no intention to abandon is shown, the law should be liberally construed to prevent a forfeiture. And where a local regulation required notice of a mining claim to be posted at each end of same, and notice was posted only at one end, all other regulations being complied with, the failure to post at both ends will not work a forfeiture, in the absence of a rule so providing.—Emerson vs. McWhirter (65 *Pacific Reporter,* 1036); Supreme Court of California.

Rights of Lower Appropriator to Enjoin Upper Appropriator.—Where an upper and subsequent appropriator of water for mining purposes on a stream makes use of the natural channel to carry off his mining debris to the damage of the lower and prior appropriator, such lower appropriator may enjoin the continuance of such wrong, though the work of the upper miner be conducted carefully, and in the only feasible way of conducting mining business by him. In such suit there is no merit in the contention that all the damage to the complainant was caused by the construction of their own dam across the stream which prevented the mining debris from above going down through their claim into another creek, since it ignores the right of the complainant by appropriation prior thereto to divert all the waters of the stream.—Carson vs. Hayes (65 *Pacific Reporter,* 814); Supreme Court of Oregon.

Rights of Location of Junior Lode Claims.—The location of a lode mining claim having the right to lay any of his lines within or across the surface

of a valid prior location, in the absence of objection by its owner, for the purpose of securing to himself underground or extralateral rights not in conflict with the rights of the senior location, where a junior claim overlaps, having one of its parallel end lines within or across a senior location, the owner acquires all the rights, both surface and extralateral, as against the Government and subsequent locators, that he could have if the prior location had not been made; and he may follow the vein in its downward course between the planes of his own end lines in all respects as though there were no prior location, except where it would conflict with the rights of the owner of such prior location.—Bunker Hill & Sullivan Mining and Concentrating Company vs. Empire State-Idaho Mining and Development Company (109 *Federal Reporter*, 538); United States Circuit Court of Appeals.

RIGHTS OF ONE FINDING GOLD ON PUBLIC LANDS.—Under the laws of the United States (Revised Statutes United States, Section 2319), providing that all valuable mineral deposits in lands belonging to the United States are free, and the Civil Code of California, Section 1006, that occupancy for any period confers a title sufficient as against all except the State and those having title, one finding and taking possession of gold on public land may recover it from any one taking it away from him. But where such party was grading on public land for a mill site, but had not complied with any of the provisions of the Revised Statutes of the United States, section 2337, for acquiring title to same, he was not occupant of any land beyond the level space graded for a mill site, and had no right to gold found by others beyond the limits of such space. Under Revised Statutes of the United States, section 2319, title to mineral lands cannot be acquired by occupancy unless the occupancy is for the purpose of mining or excavating and extracting the minerals.—Burns vs. Clark (66 *Pacific Reporter*, 12); Supreme Court of California.

ABSTRACTS OF OFFICIAL REPORTS.

Grand Central Mining Company, Mexico.

This company's report covers the year ending August 31, 1901. The report as issued from the London office gives the receipts in sterling as follows: Bullion recovered, £59,477; proceeds of tailings treated by the Minas Prietas Reduction Syndicate, £30,924; miscellaneous, £1,096; total, £91,497. The working expenses were £77,076; general expenses, £1,316; total, £78,392, leaving a balance of £13,105. In addition to the expenses noted above, the sum of £11,492 was paid for development, and £3,603 for taxes, making a total of £15,095, showing a loss of £1,990 on the year's operations. The balance carried forward at the beginning of the year was £36,112, and, deducting the loss noted above, a balance of £34,122 remained at the close of the year.

The directors' report says: "The policy of active development recommended at the last general meeting has been fully carried out by Mr. Peterson, but the directors regret that up to the present it has not been rewarded with success; in fact, Mr. Peterson states, in a letter dated October 17, 'that a point has now been reached in the Grand Central Mine where it is absolutely certain that in the immediate vicinity of the limits of the developed ore-body no other pay shoot exists. Were this the only mining property of the company it would leave the directors no alternative but to recommend immediate liquidation, but Mr. Peterson goes on to say, 'I am strongly in favor, after having carefully gone over the Verde ground and the extensions to the east, of putting down a couple of small prospect shafts to a distance of 400 feet. The open cuts on the surface have proven the existence of three parallel veins, all of them very strong, heavily mineralized, and containing most promising indications of values. To carry out this work will probably take six months longer, but it is the writer's opinion that it would be most inadvisable to liquidate before having proven conclusively the ground referred to.' Under these circumstances the directors recommend that this development work be undertaken, and upon its results depends the future of the company. It has been considered advisable to take out all the existing ore reserves from the Grand Central Mine for treatment, and this is now being done. When this has been completed, the plant and pumping machinery will be removed, which will effect a considerable saving. The reduction works continue to treat about 9,000 tons a month at a profit to this company of about $14,000. This, together with the substantial balance of cash in hand, is amply sufficient for the prosecution of the further development work recommended above.

Old Colony Copper Company, Michigan.

The report of this company for the year ending September 30, 1901, shows that the cash balance at the beginning of the year was $105,042. Interest and miscellaneous expense amounted to $4,399, making a total of $109,441. The expenditures for mining and exploration were $44,037, leaving a cash balance of $65,404 at the close of the year.

The superintendent's report shows that the development work done during the year was 145 feet of shaft sinking, 1,130 feet of tunnel, and 82 feet of drifting and cross-cutting, making a total of 1,357 feet. In addition to this there was 1,327 feet of diamond drilling done during the year. The report of President H. F. Fay says: "The Superintendent's report shows that our principal work during the year was done in the tunnel, which was extended almost 100 feet per month, and from which much valuable information wass ecured. We continued our investigation in the winz and at the North shaft early in the year by further sinking, drifting, and cross-cutting, and although this work was limited in extent we were not encouraged to pursue it any further at that time, thinking it wiser to explore with the diamond drill. The drill was started about 1,600 feet from the western boundary of the property, and has already covered a distance of nearly 1,400 feet. This has cut several favorable lodes, one of which, an amygdaloid, showed ores which promise much for its commercial value, and to explore which we are now sinking a vertical shaft. A cross-cut will be started from the bottom of this shaft, and we ought soon to be able to announce that the lode has been reached.

"It is not now intended that this investigation shall permanently supersede that at the tunnel, but the quality of the rock encountered here has encouraged us to devote all our energies to this work for the time being. By so doing we have been able to utilize the machinery which was in service at the tunnel without incurring the expense of purchasing new. We shall also continue to employ the diamond drill in exploring the territory immediately to the east."

Cape Copper Company, Limited.

This company owns a group of copper mines in the northwestern part of Cape Colony, and it also owns the Tilt Cove Copper Mine in New Foundland, which is operated by a separate company. It also owns a controlling interest in the Britonferry Chemical Company in England, where a considerable portion of the ores and mattes made by the company are treated. The capital stock is £600,000 in common stock, and £90,000 in preferred stock. The statement for the year shows receipts as follows: Sales of copper ore and metal, £319,848; profit on company's railroad, £11,312; interest, rentals, etc., £10,913; total, £342,073. The working expenses in South Africa were £115,932, and the general expenses, including the London office, were £6,501, making a total of £122,433, and leaving a balance of £219,640. To this balance is to be added £4,688 profit from the Britonferry Chemical Company; £24,567 profit from the Tilt Cove Company, and £195,734 brought forward from the previous year, making a total of £144,628. From this surplus, the sum of £11,191 was paid for income tax; £10,000 for sinking fund, and £258,750 in dividends on stock, making a total of £279,941, and leaving a balance of £164,699 forward to the current year.

The mining statement says that at the Ookiep, 19,174 tons of ore were taken out; at the smelting works 16,184 tons were treated. The matte turned out averaged 48.1 per cent of copper and was shipped to England for treatment. Work was somewhat delayed by the risarrangement of the fuel supply owing to the failure of steamers to arrive promptly. The ore reserves at this mine are estimated at 10,070 tons underground, in addition to which there are on the surface about 9,000 tons of slimes assaying about 10 per cent copper. The ore smelted averaged about 21 per cent.

At the Nababeep Mine 14,272 tons of ore averaging 6.4 per cent copper were taken out. At the smelting works the matte made averaged 57.8 per cent, which was shipped to England for treatment. The process employed at this mine also turns out a considerable quantity of copper sulphate and other by-products. The smelting works are being enlarged by three furnaces, which will considerably increase the quantity of ore treated. The new shaft at this mine has been deepened considerably during the year, and the estimated amount of ore in sight is 200,000 tons, averaging about 5 per cent copper.

In addition to the two principal mines, there are several smaller mines, or claims, on which prospecting work has been done with a view to ascertaining their probable value. Small quantities of the ore were taken from the Spectakel, the Narrap, the Carolusberg, and the Koperberg mines, all of which promise well. Development work on all these mines will be extended duringt he current year.

The accounts of the Tilt Cove Mine for the year show a gross profit of £60,591. After charging interest and some other items there remains a profit of £47,908, of which one half goes to the aCpe Copper Company, under the agreement. The mining report shows a total output from the East Mine at Tilt Cove of 54,253 tons averaging 3.3 per cent copper, and the reserves are estimated at 166,000 tons. The new South lode produced 10,206 tons of ore averaging 4.3 per cent copper and the reserves are estimated at 20,000 tons. At the West Mine work proceeded satisfactorily and some good pockets of ore were found, but the reserves are small. Prospecting work resulted in the discovery near the East Mine of another lodec alled the North lode. From this 2,994 tons of ore averaging 3.5 per cent copper were taken, and the prospects are good for a large production.

The Britonferry Chemical works were conducted successfully during the year, and produced a satisfactory profit.

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail prices. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

Jaarbock van het Mijnwezen in Nederlandsch Oost-Indie. 1901. Batavia, Java; Public Printer. Pages, 136; with maps and tables.

The Chemical and Physical Examination of Portland Cement. By Richard K. Meade. Easton, Pa.; the Chemical Publishing Company. Pages, 184; illustrated. Price, $1.

Cast Iron. A Record of Original Research. By William J. Keep. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 240; illustrated. Price, $2.50.

Boletin de Obras Publicas de la Republica Argentina. Volume II, 1901. Prepared by the Ministry of Public Works. Buenos Ayres; Public Printers. Pages, 388; with maps and diagrams.

Report of the Minister of Finance to H. M. the Emperor on the Budget of the Russian Empire for 1902. St. Petersburg, Russia; Printing Office of the Imperial Academy of Sciences. Pages, 48.

NEW PUBLICATIONS.

Discussion on the Teaching of Mathematics at the Meeting of the British Association, Glasgow, 1901. Edited by John Perry. London; Macmillan & Company, Limited. New York; the Macmillan Company. Pages, 108. Price (in New York), 75 cents.

This is a reprint of an interesting discussion in which a number of well known professors in British technical and military schools took part and gave their views on the subject. This verbal discussion is supplemented by written criticisms and suggestions from others who were unable to join in the verbal debate. The result was the appointment of a committee which is instructed to prepare a report to the association upon possible improvements in the teaching of mathematics, and the best means to be adopted for that end.

The Genesis of Ore Deposits. A Compilation of Papers Relating to the Subject of Ore Deposition Which Have Been Presented Before the American Institute of Mining Engineers. New York, 1901; published by the Institute. Pages, 827; illustrated. Price, $6.

This volume contains the famous treatise of Prof. Franz Posepny on the "Genesis of Ore Deposits," and many other further and more recent contributions to that subject, from the pens of the greatest living authorities. It is only necessary to name such authors as Posepny, Le Conte, Van Hise, Emmons, Lindgren, Rickard, Vogt, Kemp, Beck, Blake, Delauney, Keyes and Weed, whose views are here stated, to prove that no student of ore deposits can dispense with this up-to-date presentation of the latest discoveries, theories and speculations in that department of dynamic and chemical geology.

The American Institute of Mining Engineers has gathered these helpful essays into one volume, out of the many volumes of its *Transactions* through which they were scattered, thus making it especially easy for mining engineers in practice, as well as the theoretical geologist, to be kept, at all times, within reach of the opinions of the most modern investigators and teachers, and the data and reasoning by which their views are supported.

This volume is an octavo of 827 pages, bound in book linen corresponding in size and style to the annual volume of *Transactions* of the Institute.

Compressed Air. Its Production, Uses and Applications. By Gardner D. Hiscox. New York; Norman W. Henley & Co. Pages, 834; with 545 illustrations. Price, in half morocco, $6.50.

The author of this book has undertaken the very necessary work of collecting in a connected and compact form the information on compressed air which has heretofore existed mainly in detached forms—in papers published in technical journals, in the transactions of technical societies, and in the circulars and catalogues of manufacturing companies.

This work has been done very completely. Naturally it is largely in the nature of a compilation, as any work of this kind must be; but Mr. Hiscox has apparently been careful to go to the best known sources of information, and has exercised very good judgment in selecting and combining the great amount of material placed at his disposition. Some idea of the contents of the book may be gained from a brief account of the chapters which are included in the list of contents. Chapter 1, which is rather brief, is historical; chapters 2, 3, 4, 5 and 6, treat of the physical properties of air, the force of air in motion, low air pressures, the flow of air under pressures, and the force of the wind. Chapter 7 treats of isothermal compression and expansion of air; chapter 8 of thermodynamics and chapter 9 of adiabatic compression and expansion. Chapter 10 describes the compressed air indicator card, while chapter 11 treats of the actual work of the compressor. Chapter 12 relates to multi-stage air compression; chapter 13 to the expansion of compressed air and the work of the motor; chapter 14 to the transmission of power by compressed air; chapter 15 to compressed air reheating; chapter 16 to the compressed air motor and chapter 17 to the efficiency of air compressors at high altitudes. Chapters 18 to 21, inclusive, describe the different types of air compressors in present use, while chapter 22 treats of the uses of compressed air in mining and quarrying. Chapters 23 and 24 are again descriptive, of pneumatic tools of different kinds. Chapter 25 treats of air as applied to pyrometry, and chapter 26 of its use in railway service, while the three following chapters are devoted to pneumatic work of different kinds. Chapter 30 describes the use of compressed air in tube transmission, and chapters 31 and 32, its uses on shipboard. Chapters 33 and 34 relate to the use of compressed air for refrigeration and for hygienic purposes. Chapter 35 is devoted to liquid air, while chapter 36, the concluding section of the book, gives a list of patents issued in the United States from 1875 to 1901, covering the various applications of compressed air and the methods of compression.

The range of manufacturing interests in which compressed air plays an important part is so wide that special machines for the compression of free air, and for its utilization are very numerous. This has required a large number of diagrams and engravings showing the different types of machines and motors with their special applications in the various industries. The extensive use of compressed air in machine shops alone furnishes the material for a large part of the descriptive chapters of the book; while the uses of compressed air in mining and quarrying also form a very important section.

Among the other uses of compressed air which may be specially noted, are the caisson method in submarine work and in foundations for bridge piers, which is exceedingly important in engineering practice, and has enabled bridge builders to complete work which was formerly considered impracticable. The use of compressed air in refrigeration, in ventilation and in hygienic work also presents many interesting problems which have never been fully treated until recently, and which now find a place in a standard work for the first time. The chapters on compressed air motors and their relative efficiency have been very carefully worked out, and give data which will be very valuable to engineers.

Possibly the weakest part of the book is the chapter on liquid air, in which the writer seems to have been inclined to accept rather too freely the statements of Tripler and others who were interested in exploiting liquid air on the stock exchange. This part of the subject is new, however, and data are difficult to obtain.

Upon the whole, the book is an excellent one, and should be very valuable to mining and mechanical engineers as presenting in a coherent and condensed form a very large amount of information that has heretofore been available only at the cost of much time and research. Mr. Hiscox freely acknowledges his obligations to previous writers, including Weisbach, Rankine, Thurston, De Volson Wood, Saunders and others. But it must be said that he has selected and edited admirably the information which was conveyed in their separate writings.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the MANAGING EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

Thawing Dynamite.

Sir:—I notice a description and cut of a device in your issue of December 14, 1901, against which, in the interest of those who do not know the peculiarities of dynamite, I feel that I should protest.

In England careful statistics are kept regarding accidents from explosives, and it is noticeable that a large number of the accidents occurring annually are due to thawing dynamite under conditions which would be the equivalent of the method above referred to and suggested by Mr. Smith. The fact that no accident has hitherto happened where this particular device is used, is not a guarantee that an accident may not happen at any moment, and freedom from mishap with this apparatus has been due entirely to the extremely good quality of dynamite which has been thawed in it.

If a stick of leaky dynamite should some day be thawed in that can the result would be disastrous. The old-fashioned glue-pot design of thawing-can is one of the simplest and best. The water should be brought to a temperature of not over 170° F., and should then be removed from the fire before introducing the dynamite sticks. The horizontal tubular dynamite-thawer which is on the market is altogether the most satisfactory, and is perfectly easy to keep clean. For thawing large quantities of dynamite a small thawing-room, heated by steam pipes placed underneath the shelves on which the dynamite is inclined, is the most economical method. In the construction of such a thawing-room the steam pipes must be so placed that no foolish workman can by any possibility lay the dynamite sticks directly upon them.

For carrying the dynamite into mines and keeping it thawed, a double-walled tin vessel, the interspace filled with non-conducting material, and having a non-conducting cover, the inside of the can kept brightly polished, is satisfactory where small quantities only are required. Where the quantities required are large, it is desirable to have special small thawing-rooms, properly safeguarded, underground.

COURTENAY DE KALB,
General Manager, Fernando Mining Co., Mexico.
San Fernando, Mex., Jan. 2, 1902.

Popular Lectures on Civil Engineering—A Wise and Timely Scheme.

Sir: Such a series of public lectures upon subjects connected with civil engineering has rarely been offered to popular audiences as that which Prof. W. H. Burr, of Columbia University, is to give at the Cooper Union, in the course of which the University and the Union jointly maintain for the instructive entertainment of the citizens of New York. According to the notice received from Dr. Nicholas Murray Butler, the new President of Columbia, these lectures, six in number, will be given in the great hall of the Cooper Union on Tuesdays at 8 p. m., from February 4 to March 11, inclusive; they will be illustrated by stereopticon views; admission will be free to all, without tickets, and the successive topics will be as follows:

February 4. *Ancient Civil Engineering Works.*—This lecture will describe the pre-historic works of the Egyptians, Assyrians and other ancient nations, such as the canals and other artificial waterways in the Euphrates valley; the masonry and other constructions of the Chaldeans, the construction of the Egyptian pyramids; the masonry and hydraulic works of the ancient Egyptians in the Valley of the Nile; and the timber and masonry bridges, aqueducts, water-works and harbors, of the Romans.

February 11. *Bridges.*—This lecture will describe the early timber and iron bridges of this country; the beginnings of the period of rational design, involving the fundamental theories of the elasticity and resistance of such materials as iron and steel; the analysis of the simple forms of modern bridge-trusses (extended so as to include the fundamental elements of graphic analysis); the theory of continuous bridges, and the application of the theories of least work and influence lines. The latter portion of the lecture will include the treatment of masonry arches and suspension-bridges, with examples of applications to the longest spans yet contemplated.

February 18. *Water Works for Cities and Towns.*—This lecture will give some of the general considerations bearing upon the selection of suitable

water-supplies for cities and towns; the collection and handling of such supplies and the systems of distribution required for transmission to consumers, with special application to existing conditions in New York City. Attention will also be given to the proper sanitary treatment of potable waters, including the application and operation of modern filters.

February 25. *Some Features of Railroad-Engineering.*—The first part of this lecture will be devoted chiefly to a few of the main features of railroad location, illustrated by some of the more marked and difficult pieces of that class of work in this and other countries. A general and condensed statement of some features of modern railroad signaling will be made. The latter portion of the lecture will include the consideration of a few of the latest instances of locomotive-construction, including some of the heaviest and most powerful machines yet constructed.

March 4. *The Nicaragua Route for the Isthmian Ship-Canal.*—There will be given in this lecture some general considerations bearing upon the construction of canals for heavy traffic, after which a detailed description of the salient features of the Nicaragua line will be set forth. This treatment of the Nicaragua line will be based upon the extended investigations, just completed, of the United States Isthmian Canal Commission.

March 11. *The Panama Route for the Isthmian Ship-Canal.*—This lecture will comprise a concise and complete statement of the canal situation on the Isthmus of Panama, including the status of the old and new Panama Canal Companies. The greater portion of the lecture will be based, like the preceding one, upon the investigations of the United States Isthmian Canal Commission.

This list of subjects, to be treated by an authority so eminent as Prof. Burr, would deserve at any time a cordial recognition from engineers and technical journals. At the present time, several of the topics announced are peculiarly interesting to the American public, both lay and professional. But this self-evident proposition needs no enforcement here. What I wish to emphasize is a somewhat different aspect of the matter.

The usefulness of popular lectures on scientific subjects is perhaps over-rated by the general public. The experience of many years, not only as an occasional lecturer in that line, but more especially as director of the Saturday Free Popular Lectures of the Cooper Union (prior to the time when Columbia University and the New York Board of Education took up the work in which Peter Cooper had been so long an almost solitary pioneer), have led me to appreciate both the advantages and the limitations of this method of diffusing knowledge. To put it in the smallest compass—and therefore without guarding the statement carefully—illustrated popular lectures stimulate more than instruct. They introduce into lives of routine the joy of a wider outlook; but, unless they lead their hearers to real study, they bear no further fruit. This is especially true when an important topic is pictorially treated in a single lecture only. The pictures are apt to be the main thing; the subject is not stated in due proportion (those parts which are illustrated receiving special prominence); and the average newspaper report, which represents the lecture to the future historian, is such as to make the present performer writhe in agony.

One great drawback is removed when a more extended course is given by a competent lecturer. There is then time to make upon the audience a deeper impression than the mere vague recollection of lantern-pictures, and this feature I rejoice to find in the present instance. But there still remains the question, troublesome alike to lecturer and audience, How shall the earnest, yet non-expert, listener satisfy the interest which has been aroused by the partial statements of the lecturer, and the brilliant views upon the screen?

In the case under consideration, this question has been answered in a way which calls for special recognition and praise. Though not absolutely without precedent, it is not so common as to be considered a matter of course; and it might become, with great advantage to the cause of education, much more general than it has been hitherto.

Namely, President Butler announces that, in the oral delivery of these lectures, technical discussion and details will be abridged or omitted, but that Columbia University will publish at once a volume containing the lectures so enlarged as to contain the technical information not suited to such delivery, as well as the "popular" material actually delivered. The hearers of the lectures will thus not have to rely upon vague recollections, or vaguer newspaper reports, of incomplete and hurried statements, but can possess and study, immediately after the close of the course, the lecturer's full and accurate treatment of the subject.

It seems to me that this plan comes very near an ideal realization of the maximum benefit which such lectures can impart; and I hope the success of this course, and of the subsequent volume, will be such as to encourage imitations of this example.

R. W. RAYMOND.

New York, Jan. 25, 1902.

QUESTIONS AND ANSWERS

(Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, or can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preferences will, of course, always be given to questions submitted by subscribers. Books referred to in this column can be obtained from the Book Department of the ENGINEERING AND MINING JOURNAL).

Separating Molybdenite from Gangue.—Can you inform me whether there is a machine made to separate molybdenite from rock? Also what is the value of the same when separated?—G. C.

Answer.—There are numerous forms of concentrators which can be used for the purpose you mention. Any ordinary form of concentrating table would probably answer your purpose and separate the molybdenite from the rock or gangue. The value of molybdenite is generally determined by assay; the buyers do not fix any general value for the ore.

Cadmium.—I would like to ask if a deposit, rich in cadmium, which could be easily mined and concentrated, has any market value?—H. M. S.

Answer.—It would hardly have much value, unless the metal could be produced very cheaply. The production of cadmium has in several years exceeded the demand. The Silesian smelters some years ago largely increased their output in the expectation of finding an enlarged market, but failed to do so, and have since curtailed the production, until new outlets for the metal could be found. At present the demand is not large, and any new supply might force prices down below a paying point. The Silesian people could easily enlarge the quantity made, if it should be required, without increasing their expenses materially, as their cadmium is a by-product.

Hyposulphite Solutions for Gold.—In the *Transactions* of the Australasian Institute of Mining Engineers is published an account of a new solvent for the treatment of gold which is stated to be more effective and cheaper than cyanide. The materials and quantities used are as follows: A solution of 1 or 2 per cent of sodium hyposulphite, 0.75 per cent of iron perchloride and 1 or 2 per cent of acetate of soda or lime diluted to 10 times its volume, will, it is claimed, dissolve in 6 to 12 hours, 15 or 20 times as much gold as a 1 or 2 per cent solution of cyanide in the same time. The precipitate of the dissolved gold can be effected by zinc shavings, or by electrolysis. Can you inform me if the above combination has been used for the purpose on a practical scale, and if so, where, and with what result?—H. A. M.

Answer.—We are not aware that any such solution as is described as above has ever been used for extracting gold from its ores on a commercial scale. Possibly some of our readers can inform us if they have seen it tested anywhere. Prof. Henry Wurtz, "Hydrometallurgy of the Precious Metals," in the *Mineral Industry,* Volume V, page 320, says: "Two other classes of sulphur compounds—the hyposulphites and the bisulphites—have apparently comparatively little solvent power for gold, but great power over silver and its compounds, in ores and elsewhere. This applies especially to the soluble hypophosphites."

Copper Protoxyde.—What is the chief use of this product? It is reported to have been used lately for painting ships' bottoms, instead of copper sheathing. Is this true? Who are the chief producers and what is the present price? From what original material and in what way is it obtained?—M. A. H.

Answer.—Copper protoxide is quoted in New York at 40 cents per pound. There are no statistics obtainable as to the quantity produced or consumed. It has been used experimentally in paint for ships' bottoms, but no statements have ever been made as to the results, and it has not been used on a large scale. Concerning its manufacture and uses, Mr. Erik Enequist speaks—*Mineral Industry,* Volume III, pages 706 and 707—as follows:

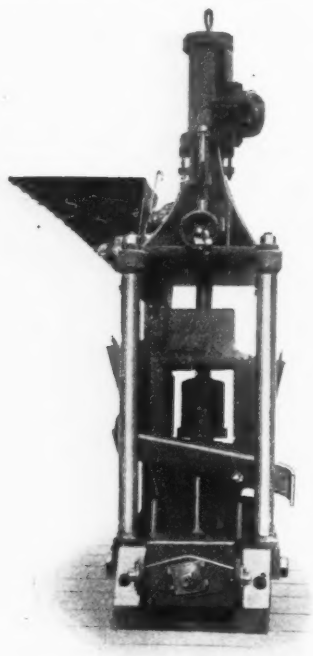
"Copper oxide (CuO), also called cupric oxide, is a black powder and is easily obtained by heating metallic copper in the air or by roasting copper sulphide. It is obtained as a by-product in large quantities by burning copper-iron pyrites for the manufacture of sulphuric acid. When the cinders have been discharged from the furnaces the copper is found as cupric oxide together with the iron oxide, and by exposing them to the action of the air and moisture and weak sulphuric acid, the copper oxide is dissolved and is drained away in the form of sulphate of copper, which may also contain some sulphate of iron, and out of this solution copper sulphate may be crystallized as blue vitriol; or plates of metallic iron may be introduced into the solution, when metallic copper will precipitate on the surface of the iron and be easily recovered. Cupric oxide is also manufactured in a smaller way from copper scales. The scales are first finely powered and then roasted in a reverberatory furnace. They are then reground and roasted again until the color is jet black. As the scales always contain some iron it is not possible to obtain pure oxide in this way. A more satisfactory method is to expose scraps of thin sheet copper in a reverberatory furnace for several hours, when the copper will oxidize thoroughly. By grinding and re-burning, an oxide of satisfactory color is obtained which is nearly pure, but may contain traces of iron, etc. By calcining the pure nitrate a chemically pure copper oxide is obtained, and it can also be obtained from pure salts of copper by precipitation with an alkali and subsequent ignition.

"Copper oxide has found a large and varied application in the industries. It has been used to great advantage in refining crude petroleum containing hydrogen suphide gas. This gas is readily absorbed by the copper oxide forming sulphide of copper and water. The copper oxide can be regenerated by simply roasting this sulphide. Cupric oxide is also used in the Edison-Lalande electric battery, which consists of a zinc element and one of copper oxide baked together in a suitable form and immersed in a solution of caustic potash or soda. This battery is said to be one of the most economical and durable in the market.

"Cupric oxide is used for coloring glass green or blue, the color obtained depending upon the way the glass is manipulated. It is also used for decorative purposes in the tile and glazed brick industry, but can hardly stand the highest heat used in the kilns; hence its employment is not always satisfactory. It is also an active oxidizing agent under heat and is employed to oxidize organic matters."

THE AMERICAN STEAM STAMP.

It is not to be expected that a small simple engine will realize the same economy of steam as can be obtained in a 2,000-h. p. steam plant with triple expansion engines and all the expense of details involved in a great installation. But the small engine serves an excellent purpose. It is not to be expected that a small prospecting mill costing a few hundred dollars will be as economical in power and labor costs per ton of ore crushed as an Alaska Treadwell mill costing hundreds of thousands of dollars. The Irishman who complained that he could get for sixpence in Ireland what cost him a shilling here, was asked why he did not stay in Ireland and enjoy this economy, but explained that he had no sixpences.



STEAM STAMP MADE BY AMERICAN ENGINEERING WORKS.

If the owner of a gold mining prospect has not got the hundreds of thousands necessary for a great mining plant and development; if he cannot safely pay interest on these sums for months and years until his mine reimburses him, he has the alternative of taking more modest steps, putting in a small reduction plant, developing his property by degrees and realizing from the mine itself to pay for its advancement to greater things.

To the mine owner who pursues this practical policy the American steam stamp offers some advantages. It is designed and constructed to avoid the weak points of small stamps previously offered for this class of work. One great difficulty has been in the skill required to keep such stamps in good running order. The adjustment necessary to compensate for wear of shoes and dies has been a troublesome point. The American stamp employs a wedge base with right and left hand screw for effecting this adjustment. This combines the power of wedge and screw, can be worked by a hand ratchet, and does not disturb the steam valve mechanism at all.

The steam valve has been troublesome in old designs, but the American type uses the steam hammer valve, which will stand years of hard usage and continue as reliable as at first.

These two features do not require any skilled attention. The possibility of grease getting into the mortar is guarded against, and there is no other point liable to give trouble under unskilled handling.

The capacity of the single stamp is large, much larger than double steam stamps, which have been previously introduced. The feeder is a familiar and reliable attachment. The number and force of blows can be set so as to obtain the best pulverizing results on the ore. Changes can be made while the machine is running, and the stamp can be left to pound ore with only occasional attention.

We have thus a stamp mill of considerable capacity, requiring only a small foundation, a boiler, and a shed for covering the little plant, and the modest cost of this equipment from which good results can be obtained is an argument in its favor. The accompanying cuts give a side view of the stamp mill and a section showing the wedge base adjustment for taking up wear of shoes and dies. All features of the stamp have been proved by use at the mines, and a machine is set up in action at the works of the manufacturers, the American Engineering Works, Chicago, Ill.

A NEW WIRE TRAMWAY.

The accompanying illustrations are from photographs of an aerial tramway recently erected by the A. Leschen & Sons Rope Company, of St. Louis, at the works of the Chicago Portland Cement Company at Oglesby, Ill.: This tramway is used for carrying crushed stone from the quarry to the cement plant, a distance of about 755 feet. The tramway was originally designed for a capacity of 40 tons per hour, making a total of 400 tons per day. This capacity has since been augmented to at least 60 tons per hour, or 600 tons per day. The tramway is of the Leschen Company's automatic type, and consists of two stationary cables supported on three to four towers in the total length of the line.

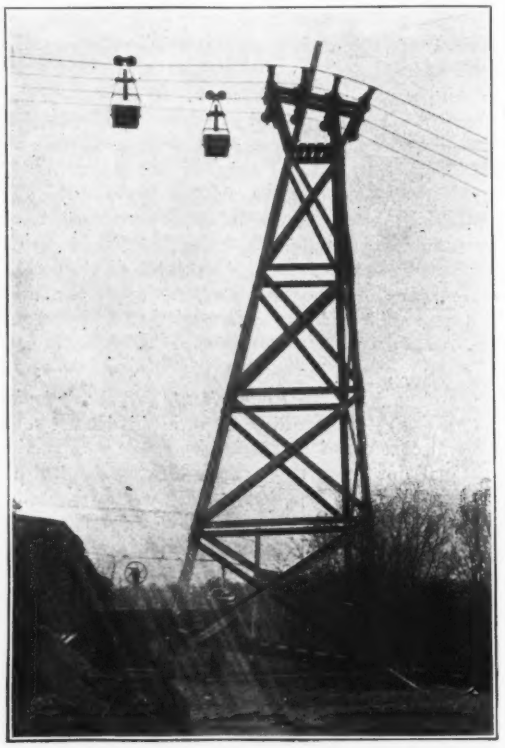
The rope upon which the loaded buckets travel is 1⅛ inches diameter and of the patent flattened strand triangular crucible steel wire type; the rope upon which the empty buckets travel is 1 inch diameter and of the same description. The buckets are propelled and controlled by means of an endless carrying cable ⅞ inch diameter and made of plow-steel wire.

The standing ropes are anchored permanently at the discharge terminal in the cement plant and at the quarry are attached to a device for stringing the cables and keeping them taut. The carrying cable passes around an 8-ft. wheel at each terminal of the line. The wheel at the cement plant has 16 grips in its periphery which clamp the rope tightly as it passes around the groove; by this means power is applied to the line for operating. The wheel at the lower terminal is mounted on a tension carriage and connected to a tightening device for keeping the cable taut. The material is elevated in the total distance of 755 feet to a height of about 165 feet. The necessary power required in operating the line is applied from the line shaft of the cement plant by means of belting and bevel gearing with friction clutch.

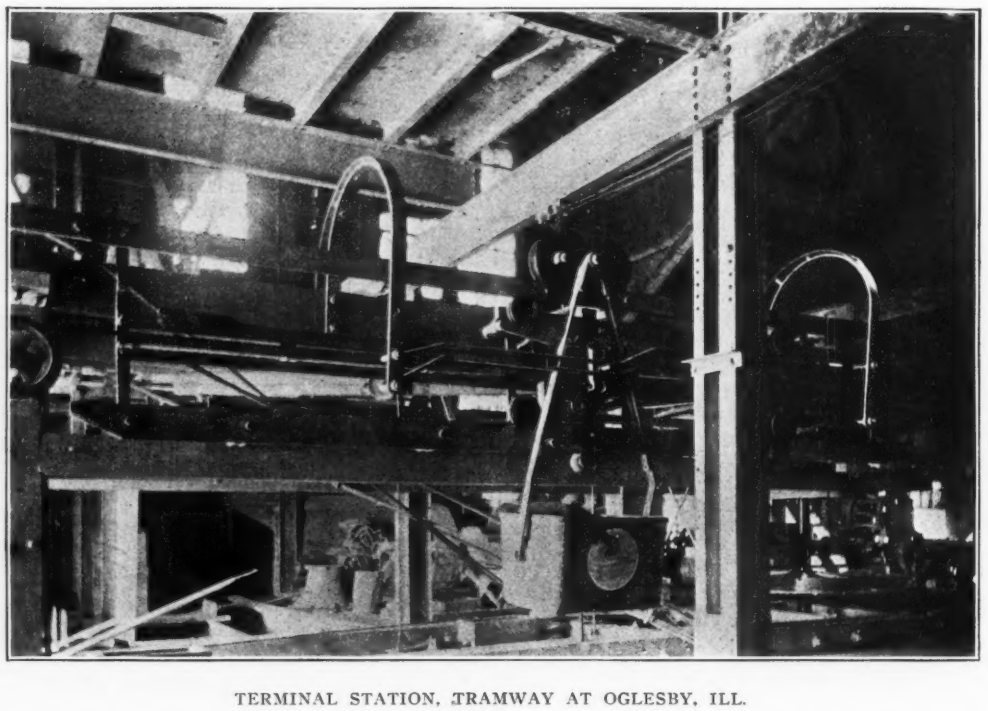
The tramway, after passing over the supporting towers on the line passes to an extremely high tower. It was so designed for the reason that the wire is required to pass over several of the buildings of the Cement Company, and this was the only way in which it could be brought up to the desired height.

The tramway at the quarry has two automatic detachers so that the material can be loaded from two separate bins. The terminal in the cement plant is so designed that the bucket upon entering is automatically detached, and at the same time automatically attached to the traction cable. Upon this traction rope are placed at equal distances patent clips, button shaped, and attached to the cable by means of drop forged clip bands. These clips enter a snow-proof housing in the bucket pendants, and by that means the buckets are transported.

When a bucket reaches the terminal at the quarry it is automatically detached from the running rope, its momentum is overcome, and it is then placed directly in front of either one of the loading chutes. After the stone is loaded into the buckets, the latter are again attached automatically to the traction cable after having received an acceleration to over-



TOWER FOR TRAMWAY AT OGLESBY, ILL.

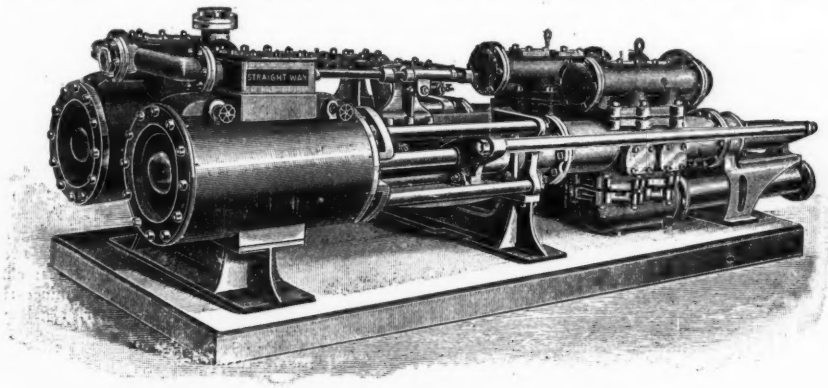


TERMINAL STATION, TRAMWAY AT OGLESBY, ILL.

come the jar of this attachment. The bucket then travels over the line to the cement plant, and there again they are automatically detached from the traction rope and their momentum is overcome. The buckets can then be dumped either where they are detached, or as is generally done, they are moved over an overhead rail to any of the several discharging points. Buckets are then returned to the terminal, where they receive an acceleration and are then attached automatically to the traction rope and pass on to the quarry. Each bucket has a capacity of 7¾ cubic feet, and holds approximately 800 pounds of the crushed stone.

LEAD-LINED MINE PUMPS.

The construction of pumps for use in cases where mine water is charged with acid, as is very frequently the case, has been a matter involving a great deal of consideration. This acid water very frequently corrodes the water-ends of pumps so rapidly that it is impossible to use iron cylinders of ordinary construction. The object has been attained in some measure by lining the water cylinders with wood; but this is a costly method, and it is found very difficult to fit barrels of the ordinary pattern with staves in such a way as to protect every part, and at the same time retain the lining permanently in place. An improvement has recently been devised by Mr. J. B. Poore, of the Scranton Steam Pump Company, Scranton, Pa., which, it is claimed, obviates many of the difficulties heretofore encountered. In this case the water cylinders of the pump are lined with lead, and the improvement was made possible by designing a cylinder of a new pattern having an internal contour readily fitted with metal cores. These cores are accurately placed in position in the barrel, which has been properly prepared, and a suitable lead alloy is poured into the annular space left, completely filling every part. A suitable counterbore is provided at either end of the cylinder so that when the head is in place there is a water-tight joint preventing the water from getting access to the iron anywhere, and making corrosion impossible. The accompanying illustration shows a pump of this type, which the makers call the "Straightway" pump.



THE STRAIGHTWAY LEAD-LINED PUMP.

As an instance of the success of this type of pump it is stated that one of them has been in constant use in a mine lifting the water 560 feet, and no repairs have been required. The old pump which this one replaced had been in use some time, and required a new water end every six months. The pump has some other features which are worth noting. Both the suction and discharge chambers are so designed and connected that they can be removed without disturbing the suction and discharge pipes, and the valve and valve seats can then be readily removed for repair and renewal. All the valves are in removable seats which are clamped between the working barrel and the chamber and can be replaced without discarding either. The makers claim that all the valve of a large pump, say 12 by 36 inches, can be removed and replaced by one man in an hour.

The pump is also so designed that one side may be disconnected for repairs while the other side can continue at work, of course handling a decreased quantity of water. All the flanges and fittings for this operation are found on the pump. The Straightway pump is made in compound and triple expansion as well as in single form.

ELECTRIC MINE HOISTS.

All who are concerned with the practical operation of mining machinery are aware of the constantly increasing use of electric power in this field. This increase is of course largely due to the natural advantages of electricity as a motive power, which advantages have also been the cause of the remarkable development of the electrical industry in many other fields during the past decade. But, in addition to its usual advantages, electric power is particularly suitable in mining operations in places not easily accessible, on account of the difficulty and expense of transporting coal for the operation of steam plants. In such cases electric power is generated in a distant station and transmitted in the form of a polyphase alternating current to the mines, for power and lighting purposes. Water power is frequently utilized, transmission lines of 20 miles are quite common and, in a few cases, power is transmitted more than twice this distance.

There is probably no machine in a mine that can be operated to better advantage by means of electric power than a mine hoist, because it is not in use constantly, but only intermittently. An electrically driven hoist consumes no power when not in use, and is always ready for service by simply switching on the current. Therefore, the remarkable convenience of electrically driven hoists is now so well recognized that a steam operated hoist is hard to find in any mine where electric power is available.

On account of the constantly increasing use of electric hoists, the following brief description of those manufactured by the C. W. Hunt Company, of West New Brighton, New York, may be of interest to our readers. The accompanying illustration shows a standard "Hunt" hoist, driven by an alternating current motor.

The three essential parts of these hoists are the rope drum, the gearing and the electric motor. Each of these parts is made in a series of sizes. By a suitable combination of these parts, a hoist of any desired capacity and speed, within the limits of modern practice, may be built.

There are four factors that materially affect the size and cost of the hoist, namely, the load, the speed, the height to which the load is hoisted and the frequency of the trips. These factors affect the size, operation and cost in the following manner:

If the load is increased, the size, weight and strength of the mechanism will be increased—that is, a larger size must be used.

If the velocity of hoisting is increased, the size and power of the motor will be increased, the other parts remaining the same.

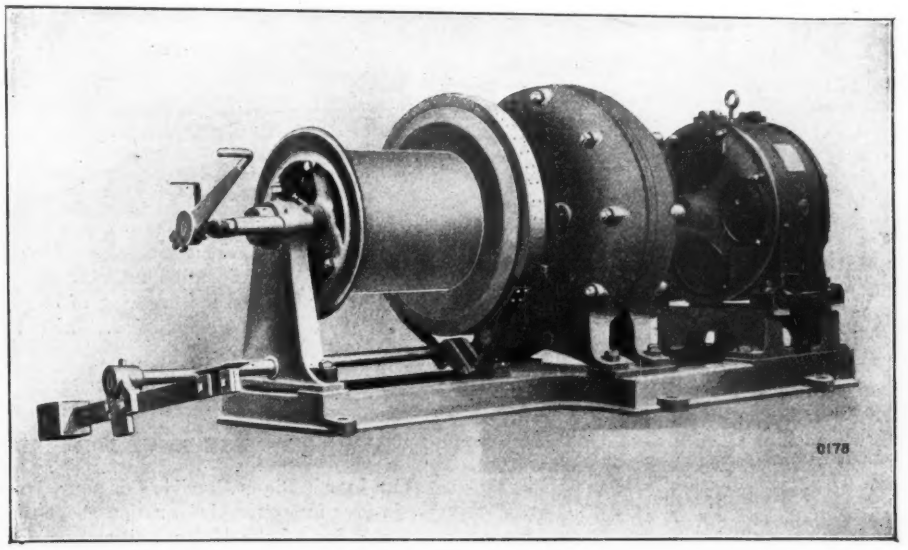
If the height to which the load is hoisted is increased, the drum must be increased to hold a longer rope, the motor remaining the same.

If the frequency of the trips is increased, the size of the motor will be increased, the other parts remaining the same.

There are three methods of operating electric hoists: (1.)—Running the motor continuously, hoisting the load by throwing in a friction clutch and lowering by a band brake. This method is suitable either for alternating or direct current motors. (2.)—Starting and stopping the motor for each lift, lowering by a band brake. This is better suited for direct current than alternating motors. (3.)—Running the motor forward to hoist and backward to lower. A direct current motor with reversing switches is used for this work.

The mechanism of the hoist is so arranged that any size or make of motor may be used. The motor is connected to the hoist by a flexible coupling.

The rope drums used in the Hunt Company's hoists vary in diameter from 12 to 60 inches. The drum barrel is sheet steel with cast iron flanges on each end. A suitable fastening is provided to secure the rope and a hole is arranged in the drum, through which the surplus rope is passed and coiled on the interior of the drum.



ELECTRIC MINE HOIST.

The necessary slipping of the friction surface generates heat that must be rapidly dissipated or the friction surfaces would soon be destroyed. This is accomplished in these drums by making the spokes in the form of propeller blades, so that whenever the drum revolves in hoisting or lowering, they force a current of air over the heated surfaces. The part of the friction generating the heat is arranged to lie directly in the path of this current of air. A remarkable difference has been noticed in rapid work between a friction clutch with this cooling device and the ordinary arrangement.

One of the difficulties in applying electricity to hoisting machinery is the necessary reduction from the high rotative speed of the motor armature to the comparatively slow speed of the winding drum. With these hoists, machine cut spur tooth gears are

employed. They are hydraulically pressed on shafts that are ground true on dead centers. The gears are completely enclosed in an oil tight and dust proof iron case, which forms a reservoir for a bath of oil in which the gears run.

Powerful band brakes are applied to the end of the drum opposite to the friction clutch so that the heat generated in one may not affect the accurate working of the other.

The remarkable convenience of the electric hoists has been found to be an important element in their favor.

There has been such a demand for them that the Hunt Company now finds it necessary to carry them in stock, nearly finished, so that it is only necessary for them to assemble the parts that are required in order to make the combination suited for a particular plant.

ROBINS BELT CONVEYOR ON A GOLD DREDGE.

BELT CONVEYORS ON GOLD DREDGES.

An opportunity of reducing the cost and, at the same time, increasing the efficiency of a dredge is to be found in the application of the perfected belt conveyor to the work of stacking tailings. The Robins Conveying Belt Company has never followed the common practice of making its experiments vicariously, or at the expense of their customer, and, therefore, when it was asked to determine the proper size and inclination for stackers of various capacities, the first step was to obtain several tons of round placer gravel of the same sizes as are found in the ancient river beds of California, the stones averaging from 4 to 8 pounds in weight, with a number of larger boulders, weighing as much as 100 pounds. The company then constructed a self-contained belt conveyor, 50 feet in length, so supported that it could be raised to any required pitch. The gravel was delivered in its normally wet condition at the foot of the conveyor, and after being delivered into a chute at its upper end, the same material was carried back by a second conveyor and was in this manner used over and over again. It was possible to change at will the speed of the inclined conveyor with an electric controller.

The use of this experimental plant may account for the success of all the tailings stackers which have been supplied by the Robins Company. An interesting example is illustrated herewith in the photographs of the Indiana Gold Dredging and Mining Company's machine at Oroville, Cal. This conveyor is 75 feet long with a 28-in. belt, and handles about 75 cubic yards of gravel per hour. The speed of the belt is 250 feet per minute and the angle of inclination is 18° above the horizontal.

A large number of other conveyors of the same type are used in the gold-fields of California and Idaho, and as far away as Colombia and Eastern Siberia. The conveyors most commonly used are 80 feet long, which permits of stacking tailings to a height of 35 feet. They are made for this work in all sizes between 20 inches and 36 inches. A great advantage of the Robins conveyor for this work lies in the fact that power can be applied at the lower end, thereby saving the long, and, generally troublesome, transmission of power by rope or chain to the head end, as is necessary with stackers of the ordinary type. But, of course, the particular advantage which appeals most strongly to the operator of a dredge lies in the fact that a belt conveyor is a very simple machine, and is therefore free from the break-downs which are constantly occurring in stackers constructed in the usual manner with a multiplicity of small parts, the breaking of one of which may at any time put the entire machine out of commission for several hours.

SILICA GRAPHITE PAINT FOR BRIDGES.

The Joseph Dixon Crucible Company, Jersey City, N. J., give interesting information about the protective painting of the Union Railroad Bridge, which crosses the Monongahela River at Pittsburg (Rankin), Pa.

The associate engineers were Messrs. Emil Swensson, Designer and Engineer of Construction, and Wm. H. Smith, Chief Engineer, Carnegie Steel Company. The total weight of this bridge is 5,135 tons, and it has a total length of 2,328 feet.

Designed for carrying molten metal from the Carrie Furnace to the steel mill and raw materials to the furnaces, this notable steel structure is subjected to heat from the molten metal, sulphur fumes from locomotives and river steamers, also from the adjoining furnaces and steel mills.

No other steel bridge in all the world is exposed to so many and severe destructive agencies. The best metal preservative was necessary, and engineers selected for its protection Dixon's silica-graphite paint, as manufactured by the Joseph Dixon Crucible Company.

PATENTS RELATING TO MINING AND METALLURGY

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon receipt of 25 cents.

Week Ending January 14, 1902.

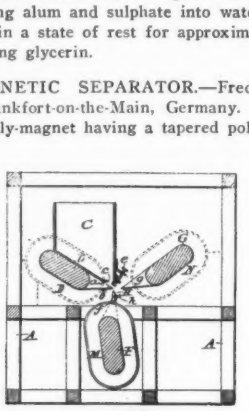
690,731. APPARATUS FOR SIFTING PULVERIZED ORES OR THE LIKE.—William Jamieson and Francis J. Odling, Melbourne, Victoria. In combination, a conically-dished sifter having a central discharge, a spindle carrying the same, and supported to tilt in different directions, a weighted disk above the sifter for acting upon the spindle, and means for driving the weighted disk to allow the same to have a lateral deflection under the action of the weight to thus tilt the spindle and sifter in different directions.

690,917. APPARATUS FOR CONTINUOUS ROLLING DIRECT FROM FLUID METAL.—Carl W. Bildt, Worcester, Mass. Horizontal, parallel, rotatory, rolls, in combination with vertical partitions arranged transversely to said rolls and extending up from the peripheries thereof, a removable plug arranged longitudinally with and between the rolls, and means for cooling said rolls, partitions and plug.

690,961 and 690,962. TREATMENT OF ARMOR-PLATES. Benton K. Jamison, Philadelphia, Pa., assignor, by mesne assignments, to National Steel Refining Company, Wilmington, Del., a corporation of Delaware. A solution for the treatment of steel, comprising the following ingredients in substantially the following proportions: sweet spirits of nitre, 3 ounces; aqua-ammonia, 3 ounces; chloride of ammonium, 6 ounces; sulphate of zinc, 3 ounces; ground alum, 3 ounces; glycerin, 8 ounces; water, 1 gallon.

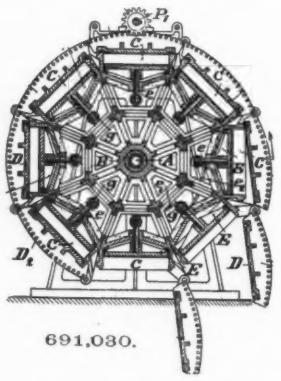
690,963. PROCESS OF PREPARING SOLUTIONS FOR THE TREATMENT OF STEEL.—Benton K. Jamison, Philadelphia, Pa., assignor, by mesne assignments to National Steel Refining Company, Wilmington, Del., a corporation of Delaware. Method of mixing solutions, consisting in first introducing alum and sulphate into water, maintaining such mixture in a state of rest for approximately 12 hours, and then adding glycerin.

691,007. MAGNETIC SEPARATOR.—Frederich A. M. Schiechel, Frankfort-on-the-Main, Germany. The combination of a supply-magnet having a tapered pole-piece, a plurality of magnets the pole-pieces of which are of like polarity with respect to each other, but of unlike polarity with respect to the supply-magnet, the pole-pieces of similar polarity facing the pole-piece of the supply magnet with an intervening space between, and mechanism for feeding the material to be treated over the edge of the supply-magnet and between it and the other two magnets.



691,007.

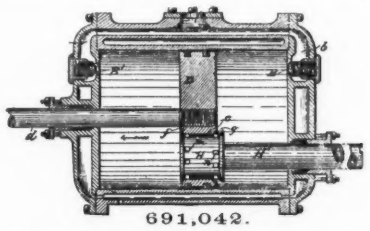
691,030. FILTER-PRESS.—Eugen Wernecke, Gerstewitz, near Weissenfels, Germany. In a filter-press the combination with a stationary frame of a hollow shaft adapted to admit the liquid that is to be filtered, a system of filtering chambers arranged in a circle around said shaft and provided with pistons and hinged covers and of means for locking said covers, admitting a charge of liquid to each of said chambers, reopening the covers, advancing and retracting the pistons and relocking the covers, such means being adapted to be automatically operated by rotating the said system of chambers around the said shaft.



691,030.

690,958. METHOD OF ELECTRIC WELDING.—Rudolph M. Hunter, Philadelphia, Pa. A method of welding two wide thin flat sheets of metal together to form one continuous sheet which consists of first shaping the end of one or both sheets so as to produce a large number of small projecting portions arranged in line across the sheet or sheets, then overlapping the ends of said sheets so as to bring them in contact alone at a series of small points in the lapped surface of the sheets, then passing a current of electricity simultaneously through all the series of small points of contact, simultaneously pressing the two sheets together as the metal about the points of contact melts whereby a large series of small fluid portions of metal are formed and gradually increased in area and separated by gradually-decreasing areas of solid or non-fluid portions until the several fluid portions just meet to form a long weld, and then arresting the current to prevent burning off of the ends of the sheets.

691,042. PISTON-VALVE FOR AIR-COMPRESSORS.—Burtwin L. Brinton and William P. Brinton, Bradford, Pa. In an air-compressor or analogous apparatus, a cylinder, a piston working in said cylinder, a piston-rod rigidly connected to the piston for operating the same, a valve traveling with and moved by the piston but having a limited movement in an opening wherein whereby the position of the valve is changed at each reversal of the direction of travel of the piston, and a hollow stem on and movable with the valve working through an opening in one end of the cylinder and adapted to communicate with the interior of the cylinder on one side or the other of the piston according to the position of the valve relative to the piston.



691,042.

691,058. PASTIL FOR MAKING OXYGEN GAS AND PROCESS OF PRODUCING SAME.—George F. Jaubert, Paris, France. The improvement in the art of producing oxygen gas, consisting in first mixing chloride of lime and an alkaline peroxide, then compressing the mixture under strong pressure, and finally placing the compressed mixture in water.

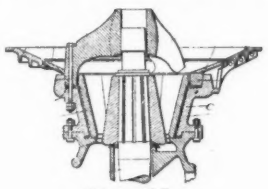
691,082. APPARATUS FOR MEASURING AIR-CURRENTS.—Joseph Thompson, Manchester, England. The combination with a rotating vertical spindle, air-cups, by which it is rotated, and a footstep-bearing, of a closed chamber filled with a non-conducting liquid in which the spindle rotates, an upper bearing provided with an oil-cup, and a flange depending from the rotating arms of the air-cups into the oil-cup to seal the bearing.

691,101. PROCESS OF REGAINING TIN.—Paul Bergsoe, Copenhagen, Denmark. Consists in subjecting a tin-bearing material to the action of a stannic-salt solution, bringing the resulting stannous solution into contact with a cathode, and with an anode of indifferent material, and passing an electric current through said solution between said anode and cathode.

691,112. ORE-ROASTING FURNACE.—Joseph P. Cappeau, Joplin, Mo. A roasting-furnace comprising a hearth supported on standards to permit free circulation of air beneath the floor of said hearth, an opening in said floor for permitting the passage of air into the hearth, and adjustable means for controlling the passage of air through said opening.

691,129. CASING-HEAD FOR OIL-WELLS.—John W. Frye, Oil City, Pa. A casing-head for wells having on its inner surface near its middle a support for the tubing, a stand-pipe, a tubing extending into the well and having an enlargement at its upper end resting upon said support, and a reducer connected to the stand-pipe and also to the top of the casing-head and inclosing the upper end of the well-tubing without being directly connected to the same.

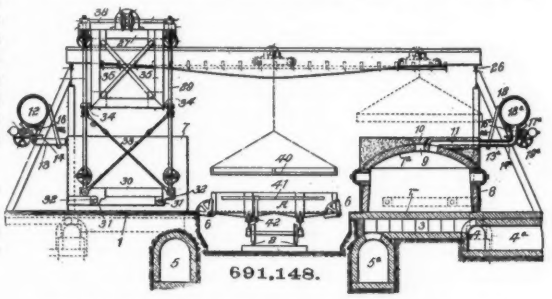
691,135. ORE-CRUSHER.—Elmer E. Hanna, Chicago, Ill., assignor to Allis-Chalmers Company, Jersey City, N. J., a corporation of New Jersey. The combination of a main frame portion provided with an annular flange at the upper part thereof forming a portion of an annular groove in its upper inner surface, crushing-concaves secured to the inner side of such frame and extending upward to form the other walled portion of said annular groove, and a spider portion provided with a circular base secured in such annular groove.



691,135.

691,145. LIME, CEMENT OR LIKE KILN.—Issai Isserlis, Kiew, Russia. A limekiln, consisting of a plurality of compartments communicating at the lower ends and each provided with a chimney in the upper end, feed-doors in said chimneys, discharge-doors at the base of said compartments, and oppositely-arranged hearths in said compartments.

691,148. PLANT FOR COKE-MAKING.—Walter Kennedy, Allegheny, Pa. The combination of a hearth, one or more ovens movably arranged on the hearth, a car having a movable side arranged in such relation to the hearth that the movable side will form a bridge from the car-bottom to the hearth and means for shifting the oven and its charge from the hearth over the bridge onto the car and for lifting and returning the oven to the hearth.



691,148.

691,158. ELECTROLYTIC SOLUTION.—Otto Meyer, Richmond, Va. An electrolytic solution containing zinc salts, magnesium salts and dextrine dissolved in water.

691,163. APPARATUS FOR PULVERIZING.—William F. McClellan, Seattle, Wash. A pulverizer, comprising in its construction means for supplying material to be pulverized, oppositely-disposed, similarly-rifled nozzles to which said material is supplied, and means for forcing said material through said nozzles, whereby the stream of material from one nozzle is revolved in an opposite direction to the revolution of the stream of material from the opposite nozzle.

691,213. BRASS-FOUNDER'S MELTING-FURNACE.—Albert J. Weatherhead and Edward H. Weatherhead, Cleveland, Ohio. A furnace, a cover therefor, a counterweighted arm engaged with said cover and having a cavity on its under side near the edge of the cover and a fixed post entering said cavity and serving as a pivot-point for said arm and cover and on which they are laterally rotatable.

691,235. CABLEWAY.—William F. Brothers, Brooklyn, N. Y., assignor to the W. F. Brothers Company, Jersey City, N. J., a corporation of New Jersey. A cableway comprising a cable supported at each end by inclined sheers, each held movably at the base so as to yield with variations of load upon the cable. a gravity-anchor being so suspended from each sheer upon the side opposite to the cable that the anchors may rest on the ground when the cable is under tension.

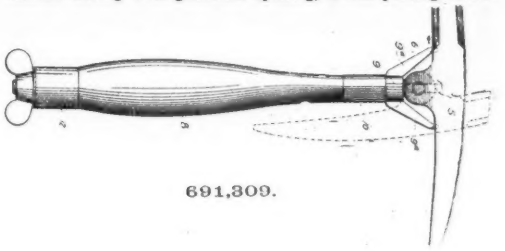
691,244. APPARATUS FOR POURING METAL INTO MOLDS.—James V. Coleman, San Francisco, Cal. In an apparatus for pouring metal into molds, a stationary base, a traveling mold-carrier mounted thereon having rectilinear movement, a stationary support provided with open sockets, a crucible-carrier, mounted to swing in a vertical arc, and means connecting the mold-carrier with the crucible-carrier, whereby the movements of the latter in its support produce progressive movement of the mold-carrier toward and under the crucible.

691,262. MAGNETIC SEPARATOR.—Gustaf Grandal, Pitkaranta, Russia. A magnetic separator having a rotatable non-magnetic cap, magnetic lamellæ inserted in said cap, of increasing size from the point where the material first comes under their influence to the point where it leaves it, said lamellæ being magnetically insulated from each other, whereby a turning of the particles to be separated is accomplished due to the change of polarity upon leaving the edge of one lamella and taking up position with the next.

691,278. COMPRESSED-AIR WATER-ELEVATOR.—John L. Latta and James A. Martin, Hickory, N. C. The combination with liquid-chambers provided with valved inlet-ports, and a communicating liquid-conveyer, of valve mechanism including separate pressure-chambers, in communication, respectively, with the liquid-chambers, a rocking valve having inlet and exhaust ports in communication with said pressure-chambers, means controlled by the level of liquid in the liquid-chambers, for causing an initial movement of the valve, when the contents of the liquid-chamber have been partially discharged, and a counterbalancing device connected to and movable with the valve.

691,297. OPEN-HEARTH STEEL PROCESS.—John L. Smith and Robert Bedford, Jr., Eaglescliffe, England, assignor of one-third to the South Durham Steel and Iron Company, Limited, Stockton-on-Tees, England. A continuous process of manufacturing steel, which consists in preparing a bath of molten steel in an open-hearth furnace provided with compartments, drawing off from time to time steel from one of said compartments, charging the empty compartment with solid materials, heating the furnace, allowing an additional charge of molten metal to run into said furnace, making a bath which extends over all the compartments, and working the charge.

691,309. PROSPECTOR'S PICK OR SIMILAR TOOL.—Felix S. Goldsmith, Denver, Colo. The combination of a handle having a longitudinal opening, a rod passing therethrough, a head pivoted to one extremity of the rod, a device movably mounted adjacent the head and adapted when in the plane of the head to lock the latter against turning on its pivot.

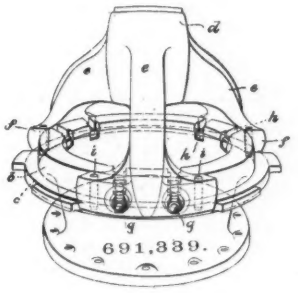


691,309.

691,324. PIGMENT AND THE PRODUCTION THEREOF FROM FERROUS LIQUORS.—Alexander S. Ramage, Cleveland, Ohio, assignor, by direct and mesne assignments to Elmer A. Sperry, Cleveland, Ohio. A process of preparing basic ferric hydrate from ferrous sulphate or chloride liquors, which consists in blowing with air a mass brought to the condition described, and precipitating basic ferric sulphate or chloride in the presence of a sufficient volume of water.

691,336 and 691,337. PROCESS OF FEEDING FINE FUEL.—Rolla C. Carpenter, Ithaca, N. Y., assignor to Atlas Portland Cement Company, a corporation of Pennsylvania. The process consists in producing jets of air and fine fuel and in directing such jets into said furnace to assume an eccentric position in said furnace to produce a hot zone in said furnace by the eccentric position and by the proximity of such jets to the walls of said furnace.

691,339. ROCK OR ORE BREAKER.—Albert J. Gates and Thomas W. Capen, Chicago, Ill., assignors by mesne assignments, to Allis-Chalmers Company, Chicago Ill. a corporation of Illinois. The combination with the rim of the crushing-chamber of a shoulder upon the rim, a spider comprising a heavy cast stationary hub and heavy arms integral therewith which extend independently outward beyond and are snapped to the rim of the crushing-chamber and seated upon the shoulder thereon and means for firmly fastening the ends of the arms in position.



691,339.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy.

Week Ending December 21, 1901.

22,121 of 1900. CYANIDE MAKING.—G. Craig and R. M. Paterson, Glasgow. Method of removing alkaline sulphur and carbonates from cyanides made by the ammonia process.

601 of 1901. MAKING ANHYDROUS BARYTA.—P. L. Martin, Tourcoing, France. Making anhydrous baryta, by roasting barium salts in a closed receptacle.

1738 of 1901. TREATING TELLURIDES.—W. Rethybridge, London. Method of decomposing telluride of gold by the action of ferric chloride solution, thus dissolving the tellurium and setting the gold free.

1,783 of 1901. CATHODE.—P. La Cour, Askov, Denmark, Improved mercury cathodes for cells, used in the electrolytic decomposition of salt.

1,904 of 1901. SULPHURIC ACID MAKING.— Badische Anitur and Soda Fabrik, Ludwigshafen-on-Rhein, Germany, Improved process for producing a pure sulphuric acid free from arsenic nitrous compounds and lead.

2,342 of 1901. POTASSIUM SALT TREATMENT.—H. Recht, Stassfurt, Germany. Producing potassium magnesium carbonate by acting with carbonic acid on a solution of potassium chloride and magnesium carbonate.

12,612 of 1901. DIAMOND CUTTER.—C. Wauters, Antwerp, Belgium. Cutter for diamonds, preserving the small parts cut off instead of grinding them to powder.

15,005 of 1901. COKE OVEN DISCHARGE.—Wellman-Seaver Engineering Company, Cleveland, Ohio, U. S. A. A machine for discharging and recharging coke ovens, at the same time thus obviating loss by cooling.

19,029 of 1901. PETROLEUM REFINING.—F. C. Thiele, J. M. Parker and J. F. Fincke, New Orleans, U. S. A. Process for refining refractory crude petroleums.

PERSONAL.

Mr. A. H. Tarbet is in Salt Lake, Utah.

Mr. Frederick S. Harris has charge of the Dorado Mine at Carbo, Sonora, Mex.

Mr. John C. Fitzer, of Chicago, Ill., has been examining mining property at Black Hawk, Colo.

Mr. J. M. Shrote, of Denver, Colo., has been visiting Gilpin County, Colo., looking after mining interests.

Mr. C. W. Kempton, mining engineer of New York city, is at present in Chile on professional business.

Mr. F. B. Turner, consulting mining engineer of Butte, Mont., is spending the winter in Phoenix, Arizona.

Mr. F. G. Kelly, of Black Hawk, Colo., is at Rapid City, S. Dak., making an examination of some mining property.

Mr. C. C. Page, of Holdredge, Neb., has been visiting Gilpin County, Colo., and investigating mining property.

Mr. George Kingdon, superintendent of the mines of Phelps, Dodge & Company, at Hanover, N. M., is visiting Globe, Ariz.

Mr. A. Graves, manager of the Alma Mining Company at Carbo, Sonora, Mex., has been in Denver, Colo., testing ores from the mines.

Mr. Clarence K. Colvin, who is interested in Gilpin County, Colo., mining property, has gone to Sonora, Mex., to examine mines for Colorado parties.

Mr. Wayne Choate, consulting engineer of the Ophir Mining and Milling Company, is making headquarters with that company in Salt Lake, Utah.

Mr. George I. Whitney, of Pittsburg, Pa., has spent a week at the mines and power plant of the Whitney Reduction Company in North Carolina.

Mr. H. Tromp, of The Hague, Holland, is looking over the chemical mills and smelters of Colorado to secure information concerning the treatment of ores.

Mr. Frank Ashton, formerly superintendent of the Dolores Mining Company at Dolores, Chihuahua, Mex., has resigned his position and gone to New York.

Capt. W. Murdock Wiley has been appointed manager of the Union Copper Mine in Rowan County, N. C., to succeed Mr. Carl Hendrich, who has resigned.

President A. W. Thompson, Vice-president Houston, and General Counsel Harry Rubens, of the Republic Iron and Steel Company, have been in Birmingham, Ala.

Judge E. H. Gary, of the United States Steel Corporation, has been elected chairman of the Allis-Chalmers Company. Mr. William Allis retires on account of ill health.

Mr. Don H. Bacon, chairman of the Board of Directors of the Tennessee Coal, Iron and Railroad Company, is in Birmingham, Ala., looking over the company's interests.

Mr. Sam T. Parks, of Jackson, Cal., has gone to Panama, Colombia, where he will be on the staff of the Darien Gold Mining Company, of which W. E. Proctor is superintendent.

Messrs. W. A. Garrett and John Gutus, county officials of Phelps County, Neb., were in Gilpin County, Colo., recently looking at some mining property in which they are interested.

Mr. John Dowling has resigned as superintendent of the Bessemer division of the Tennessee Coal, Iron and Railroad Company. Mr. Dowling was with the Tennessee Company for several years.

Mr. T. A. Yagerman, of London, who has been at Ouray, Colo., examining the Camp Bird Mine for the Venture Company, of London, recently returned to London, and will go to the Transvaal.

Mr. K. Sida, an official of the Japanese Naval Department, is now in the United States for the purpose of placing orders for machine tools for a new ship-building plant, which is to be established in Japan.

Mr. Robert Hamilton, of the Hamilton Manufacturing Company, who has been the local manager of the company at Vancouver, B. C., has been transferred to the headquarters office at Peterboro, Canada.

Mr. A. R. Bushnell has resigned his position as manager of the mining interests of J. A. Robertson, at Monterey, Mex. He will open an office at Monterey and will handle mining, agricultural and industrial properties.

Mr. J. B. Gow, of Scotland, principal owner, and Mr. W. A. Stent, manager, have been at Dolores, Chihuahua, Mex., accompanied by Messrs. Argal and Mitchell, of Denver to inspect the mines of the Dolores Mining Company.

Mr. Hartwig A. Cohen, president of the Consolidated Mercur Mines Company, of Utah, is in Shasta County, Col., visiting the Bully Hill mines belonging to Capt. J. R. Delamar, for whom he acts as a personal representative.

Mr A. B. Hall has resigned as superintendent of the Reward Mine, Independence, Cal., and has accepted a similar position with George & Co., of Los Angeles, Cal., taking charge of their mine at Hot Spring Junction, Ariz.

Mr. Jesse J. MacDonald has resigned his position with the Gold and Silver Extraction Company of America, Limited, but will continue to identify himself with cyanide matters in California and Arizona, having headquarters at 128 North Main street, Los Angeles, Cal.

N. C. Ricker, Dean of the College of Engineering of the University of Illinois, has been appointed by President Roosevelt a member of the committee for 1902 to meet at the United States Mint at Philadelphia to certify to the weight and fineness of the government coins.

Mr. Perry D. Mackey, one of the superintendents of the converting department of the Edgar Thomson steel works at Braddock, Pa., has left for Youngstown, O., to become general superintendent of the converting department of the Republic Iron and Steel Company's plant.

Mr. W. H. Purcell, superintendent of the Morgan Engineering Company, at Alliance, O., has resigned his position. Mr. J. L. Lloyd has been appointed his successor. Mr. C. L. Taylor has been made chief engineer, Mr. T. D. Russell assistant treasurer and Mr. A. F. Morris manager of the sales department. Mr. R. K. Wilthman has been appointed superintendent of maintenance.

Messrs. Alex. Ericson and John R. Collins, of Ishpeming, and Ralph Wilcox, of Negaunee, Mich., diamond drill operators, and Charles Norman, of Ishpeming, a diamond drill setter, are to leave soon for the gold fields of Africa, having contracted with the Sullivan Machinery Company of Chicago for one year. Mr. Ed. Harrington, of Ishpeming, also goes as foreman of the party.

Messrs. F. W. Johnstone and R. M. de Arozarena have opened an engineering office in the City of Mexico, Mex. They will take up questions pertaining to mechanical, mining, civil and electrical engineering. Mr. Johnstone has long been superintendent of motive power for the Mexican Central Railway, while Mr. de Arozarena has been an engineer and contractor, and has a wide acquaintance among the business men of Mexico.

Mr. W. L. Simonton, general manager of the Emlyn Iron Works, of East Chicago, Ill., has been appointed general manager of the Republic Iron and Steel Company, to succeed Mr. W. E. Taylor, resigned. Mr. Simonton has in the past few years been with the American Car and Foundry Company, of Detroit, and later with the Republic Company, leaving the latter when he, with others, bought the Emlyn Works in 1900. Mr. Simonton resides in Chicago.

OBITUARY.

William M. Seyfert died on January 18 at his home in Philadelphia, aged 81 years. He was stricken with paralysis about a year ago, and never recovered. Mr. Seyfert was president of the Reading Iron Works of Reading, Pa., and was also actively interested in several commercial and industrial enterprises in Reading and Philadelphia. In early manhood Mr. Seyfert participated in the construction of the Croton Aqueduct, in New York. On the death of his father, Simon Seyfert, in 1848, one of the pioneers of the iron industry of Pennsylvania, he succeeded him as one of the stockholders and as president of what is now known as the Reading Iron Works.

C. P. Williamson, president of the Williamson Iron Company, of Birmingham, Ala., died at his residence in Birmingham last week. Mr. Williamson received his education in Indiana and worked in iron shops in Louisville, Ky., until 1874, when he went to Birmingham. He was a partner in the Birmingham Car and Foundry Company, now known as the Linn Iron Works, remaining in the concern for 3 or 4 years. Then he started the Jefferson foundry and built the Williamson furnace which started the furnace boom in Birmingham and in the Birmingham District. He was still at the head of the Williamson foundry and furnace at the time of his death. His remains were taken to Louisville for interment. He left a son and 2 daughters.

Christopher Zug, the oldest ironmaster in the United States, died at his home in Pittsburg, Pa., on January 20. Mr. Zug, who was of Swiss ancestry, was born near Carlisle, Pa., in 1807. He went to Pittsburg in 1835. In 1846 he formed a partnership with other Pittsburg men and engaged in the iron business. In 1854 the firm became Zug, Lindsay & Co., and in 1856 it became Zug & Painter. In 1864 Charles H. Zug was taken in as a partner, and in 1896 C. H. Reid, who had been with the firm for 15 years, became a partner. For years the plant has been known as the Sable Iron Works.

Mr. Zug died wealthy, though his fortune was not as large as those of other iron manufacturers. He was a man of powerful physique, though not much above average stature. He had a remarkable memory which he retained to the last and many stories are told of his personal peculiarities. He maintained an active interest in his business up to the day of his death.

J. Roderick Robertson, of Nelson, B. C., was one of the victims of the explosion at the Park avenue subway in New York City on January 27. Mr. Robertson was instantly killed by a falling ceiling while in his room at the Murray Hill Hotel. He was well known throughout British Columbia, for though a Scotchman by birth, he had spent many years in the province. He was formerly interested in mining on Vancouver Island but for several years had given most of his time to operations in the Kootenay country. Mr. Robertson was general manager of the London & British Columbia Goldfields and was a man of means. He had many warm friends and his death will be widely regretted. The fact that he was president of the British Columbia Mine Owners' Association is evidence of the extent of his mining interests and the esteem in which he was held. Mr. Robertson was 52 years old and left a wife and 2 sons.

SOCIETIES AND TECHNICAL SCHOOLS.

ENGINEERS' CLUB OF ST. LOUIS.—At the meeting on January 22, Messrs. Burt Cole, John Cooley Robinson, Thomas Courtney Moarshead and John Vaughan McAdam were elected to membership. The secretary announced that the president had appointed the following committees: Entertainment committee—Mr. W. A. Hunicke, chairman; Messrs. T. M. Post and Mark Bary. Members of the managing board of the Technical Clubs of St. Louis—Messrs. B. H. Colby, J. L. Van Ornum.

On motion of Mr. Johnson, the chair was instructed to appoint a committee of three to secure designs for the die for the gold medal and certificate of award in accordance with the report of the committee on prizes. The following were appointed on this committee: Messrs. Roper, Bryan and Colby.

The chairman then introduced Mr. C. F. Longfellow, Commissioner of Public Buildings of the city of St. Louis, who addressed the club on "The New St. Louis Hospital."

INDIANA ENGINEERS' SOCIETY.—The convention of the Indiana Engineers' Society will be held at Indianapolis, January 29 to 31. The officers are: President, W. D. Pence, Purdue University; secretary, C. C. Brown, Indianapolis. Among the subjects for papers and discussions are: "Report of Committee on Materials of Construction," W. K. Hatt, Lafayette; "Notes on Portland Cement," S. B. Newberry, Sandusky, O.; "Concrete Arches," D. B. Luton, Lafayette; "Strength of Re-inforced Concrete," W. K. Hatt, Lafayette; "Some Steel Concrete Construction," A. L. Johnson, St. Louis, Mo.; "Bridges and Masonry—Masonry Arches," G. E. Nasche, Lafayette, and F. W. Keller, South Bend; "Surveying Field Notes," L. S. Alton, Rensselaer; "Report of Committee on Drainage," M. B. Miller, Lafayette; "Measurement of Water," C. V. Seastone, Lafayette; "A Tippecanoe River Water Power," J. W. Fawcett, Delphi; "Water Works, Explanation of Working of Air Lift," F. A. W. Davis, Indianapolis; "Power Transmission as a Distinctive Branch of Mechanical Engineering," E. C. De Wolf, Milwaukee, Wis.

ENGINEERS' CLUB OF PHILADELPHIA.—At the meeting on January 18, there were 73 members and visitors present. The annual reports of the directors and of the treasurer were presented, discussed and approved.

Mr. Carl Hering presented certain resolutions which were amended on motion of Prof. L. F. Rodinella urging the Philadelphia members of Congress to advocate the adoption of the metric system by the United States. The subject was discussed, and the resolution laid upon the table.

In the absence of Dr. Henry Leffmann, retiring president, his address on "Ancient Metallurgy" was read by the secretary. The paper consisted of an historical sketch of the development of metallurgical methods from those described in a work by Theophrastus, about 300 B. C., to the beginning of the modern science.

The following officers were elected: President, Henry J. Hartley; vice-president, Silas G. Comfort; secretary, L. F. Rondinella; treasurer, Geo. T. Gwilliam; directors, for two years, Charles Hewitt, Thos. C. McBride, H. K. Myers.

On behalf of the retiring president, Mr. Schermerhorn thanked the club for the courtesy accorded to him in the administration of his office, and introduced the new president, Mr. Henry J. Hartley, who acknowledged the honor shown him, and pledged his best efforts for his term of office.

INDUSTRIAL.

The Vajen-Bader Company of Indianapolis, Ind., states that the Chilian navy has recently purchased 10 Vajen-Bader head protectors.

The St. Louis (Mo.) branch of Henry R. Worthington, William M. Reeves, manager, reports a fairly active call for all kinds of pumping machinery.

The new plant of the Cook Well Company, of St. Louis, Mo., at Lawrenceburg, Ind., will be in operation shortly. The old plant was destroyed by fire in November.

The Ludlow-Saylor Wire Company, of St. Louis, Mo., is letting contracts for doubling the capacity of the factory's power plant, and for a new building for housing a galvanizing plant.

The St. Louis (Mo.) Vitrified and Fire Brick Company has increased its capital stock from $75,000 to $100,000. The assets of the concern are given as $106,613, and its liabilities as $30,029.

The Lukens Iron and Steel Company, of Coatesville, Pa., has purchased the Reynolds iron works in New Orleans, La., in order to add to its facilities for marketing heavy material. J. W. Porch is manager of the branch.

The Arthur Fritsch Foundry and Machine Company, of St. Louis, Mo., says it is very busy in both the machine and foundry departments, and is making heavy shipments of crushers and rolls to the Rocky Mountain country.

The Robert Aitchison Perforated Metal Company, of Chicago, Ill., report among recent orders one from New Zealand and one from Glasgow, Scotland. Extensions in its factory at South Chicago have been found necessary and additions have been made to the machine and die shop and a building erected for factory office.

The Chicago Pneumatic Tool Company, of Chicago, Ill., reports that since its reorganization orders for compressors, pneumatic tools and appliances, including cranes and hoists, received from January 1 to 15 equal the total December business, though greater than that of any preceding month. The orders include one for 80 tools from the Cramp Shipbuilding Company.

The New Process Raw Hide Company, Syracuse, N. Y., recently received an order from the British Westinghouse Electric and Manufacturing Company for 60 New Process noiseless pinions for the equipment of the British Company's new plant. These pinions are to be used on motors for driving machine tools, electric cranes, etc., and are for transmitting from 5 to 40 h.-p.

At the recent annual meeting of stockholders of the Republic Iron Company, in Cleveland, Ohio, the following officers were elected: President and treasurer, W. D. Rees; vice-president, Samuel Mather; secretary, William B. Castle; directors, H. B. Perkins, G. W. R. Matteson, Samuel Mather, Peter White, J. V. Painter, W. D. Rees, N. M. Kaufman, A. Hart, W. F. Dummer.

The S. H. Supply Company, of Denver, Colo., is now dismantling the works of the Gillette Reduction Works at Gillette and also the works of the Oneida Company at Victor, Colo. The former a chlorination mill could not operate profitably in the district owing to expensive labor and railroad discrimination. The latter, a desulphurizing and amalgamation process, was not suited to the character of ore and was abandoned after three months' use.

Stockholders of the Cambria Steel Company have elected the following officers: President, Powell Stackhouse; vice-president, John W. Towninson; assistant secretary and treasurer, Alexander P. Robinson; general manager, Charles S. Price. The following directors were elected: George F. Baer, Theodore N. Ely, Frank J. Firth, Leonard C. Hanna, Effingham B. Morris, Powell Stackhouse, Edward T. Stotesbury, John W. Townsend and R. Francis Wood.

It is announced that a consolidation of various pneumatic tool concerns in this country and England is to be known as the Consolidated Pneumatic Tool Company, Limited. Its headquarters will be in Chicago, and its president will be E. N. Hurley, now president of the Standard Pneumatic Tool Company J. W. Tierney, of Philadelphia, will be vice-president. The capital will be about $5,000,000, of which $550,000 will be preferred and the remainder common stock.

The Colorado Iron Works, of Denver, Colo, has received an order for a 1,000-lb. rapid drop 10-stamp mill, crushers, feeders and power for the Erbe Exploration Company, in Old Mexico, also for 2 25 cu. ft. screw dump slag trucks for the Selby Smelting and Lead Company, of Selby, Calif.; 2 40 in. by 144 in. silver lead blast furnaces and one 38 in. by 180 in. steel jacketed copper matting furnace and 6 fore hearths for the Ohio & Colorado Smelting and Refining Company, of Salida, Colo., and for a complete silver lead smelting plant consisting of a 42-ton blast furnace with accessories for Enrique Langenscheidt, Guanajuato, Mex.

The Atlantic, Gulf & Pacific Company, with New York City offices in the Park Row Building, has secured a contract valued at $550,000 for the construction of the Sangley Point coaling station at Cavite, P. I. The contract calls for 2 steel coal sheds, 145 ft. by 193 ft., one steel wharf 75 ft. by 410 ft., one steel coal bunker 30 ft. by 360 ft., 2 traveling coal hoist towers each of 50 tons capacity per hour, 12 automatic elevated coal railways, 1½ miles of coal railway, with cars, tubs, floor valves, etc., 50,000-gal. gravity water storage system, power and pump house for 200 h.-p., etc. About 3,400 tons of steel and iron will be required, the bulk of which will be supplied by the American Bridge Company. The coal towers and the 1½ miles of coal railway, etc., are to be furnished by the C. W. Hunt Company. The material, etc., is to be shipped, chiefly from New York, inside of 6 months.

The New York office of Westinghouse, Church, Kerr & Company reports an order for two 100-in. 24-grate stokers to Obermeyer & Liebman, of Brooklyn, a complete stoker and economizer plant with stack and mechanical draft to the Union Bag and Paper Company of Sandy Hill, N. Y.; 2 138-in. 24-grate and 4 132-in. 22-grate stokers to the British Westinghouse Electric and Manufacturing Company at Manchester, England. The Boston office reported the sale of an equipment of dampers and actuating mechanism for economizers to Sanderson & Porter for the Rockingham County Light and Power Company at Portsmouth, N. H., and the Detroit office 3 54-in. 20 grate stokers to Col. Frank J. Hecker for the Washington Arcade Building plant in Detroit. The Chicago office added a list of 4 plants, comprising 12 stokers, and including a 48-in. 20-grate stoker to Sligar & Holloway, Indianapolis; one 84-in. 22-grate stoker to the United States Board and Paper Company, of Carthage, Ind.; eight 54-in. 22-grate stokers to the United States Mining Company at Salt Lake City, Utah, and two 93-in. 22-grate stokers to Deere & Company, of Moline, Ill.

The Consolidated California & Virginia Mining Company has awarded a contract to the Allis-Chalmers Company, of Chicago, through its San Francisco agent, Mr. George E. Ames, for 3 duplex double-acting electric driven Riedler pumps, each having a capacity sufficient to raise 1,500 gals. per minute from the 2,150-ft. level to the Sutro tunnel, an elevation of about 450 ft. Each of these units will be driven by a 225 h.-p. Westinghouse induction motor, operating at a speed of 495 revolutions per minute. It is intended that these pumps shall run at 110 revolutions per minute, and the motor speed reduced to that of the pumps by means of a cut cast iron gearing. The combined capacity of these 3 units will be 4,500 gals. per minute, and they will be arranged so they may be operated singly or in combination. The electrical energy will be transmitted from the surface to these pumps on the 2,150 station at a potential of 2,300 volts by means of a 3-conductor, iron-armored, lead-covered cable. The general arrangement for the pumping plant was perfected by Superintendent Joseph R. Ryan and Mr. Leon M. Hall, consulting engineer for the mining companies, and the pumps will be of the Riedler type, with mechanically operated valves.

TRADE CATALOGUES.

A neat little red covered pamphlet of 36 pages, published by the Westinghouse Electric and Manufacturing Company of Pittsburg, Pa., describes the company's O. D. transformers, showing their construction in detail, and giving diagrams of the results of tests.

The Allis-Chalmers Company, of Chicago, Ill., publishes a 162 page pamphlet giving a list of users of Riedler pumping, compressing and blowing engines. The pamphlet contains not only names and addresses but also brief details of the engines used, including type, capacity, etc. The list of names includes well-known mining and industrial concerns in the United States, Alaska, Hawaiian Islands, Mexico, South Africa and New Zealand.

Messrs. Charles H. Besly & Co., of Chicago, Ill., report their general business very good, particularly in Badger oil cups to be used with Helmet oil. This cup has an octagonal cap, and is made in 6 sizes ranging from 1 1-4 in. outside diameter to 3 5-8 in. outside diameter, with pipe thread from 1-4 in. to 1-2 in. A sample of this cup will be mailed free upon application together with prices and full descriptive matter. A revised edition of Charles H. Besly & Company's catalogue with discount sheet of January, 1902, is mailed free upon application.

Catalogue No. 3 of the Pacific Tank Company, of Los Angeles, Cal., a pamphlet of 148 pages, describes cyanide tanks and fixtures made by the company for the McArthur-Forrest process or the Wisnall & Frank dioxide-cyanide process, also decantation tanks, chlorination tanks, copper-leaching tanks, hyposulphite tanks, plain water tanks and patent extra large non-shrinking tanks for oil or water. The company in addition manufactures machine banded wood pipe and the Wheeler patent continuous stove pipe for carrying large quantities of water under heavy pressures. The fixtures carried by the company include ore cars, pumps, zinc boxes and zinc lathes, drying pans, crucibles, furnaces, etc.

The Baldwin Locomotive Works, of Philadelphia, Pa., continues to issue its readable Record of Recent Construction, No. 31, a pamphlet of 32 pages printed in French and English describes among others, a 94-ton consolidation locomotive built for the Union Pacific Railroad; an 80-ton 8-coupled switching locomotive for the Lehigh Valley Railroad; a 76-ton, 10-wheel locomotive for the Butte, Anaconda & Pacific Railway; a 40-ton mogul locomotive for the Ecuadorian Association, Limited; a 6-coupled switching locomotive for the Societie Miniere et Metallurgie de Penarroya, of Spain, and a 6-coupled double-ender locomotive for the Government Railways of New Zealand.

Truax automatic ore cars are described in a neat 24-page pamphlet that is sent out by the Globe Iron Works, of Stockton, Cal., sole manufacturers for the Pacific Coast. These cars, the catalogue states, are built of the best quality of steel, wrought iron and malleable iron. An automatic opening and closing door is said to do away with the disadvantages of a lever on the back. Such doors open before starting the dump, allowing some of the ore to fall out and increasing the weight lifted in dumping. It is claimed also that the new door holds the ore until the car is partly dumped, thus permitting the wheels to be set further toward the door end, distributing the load more evenly on the axles. There is no hinge rod across the top of the cars and after dumping the door locks automatically. The cars are said to be 6 to 10 in. lower than other cars of like capacity and are provided with self-oil wheels having malleable iron dust caps. Side dump cars, scoop cars and water and ore skips are also described in the pamphlet a copy of which may be had on application to the company.

Acheson graphite electrodes, made of artificial graphite, are described in an attractive 19-page pamphlet published by the International Acheson Graphite Company of Niagara Falls, N. Y. These electrodes are recommended for electrolytic and electro-metallurgical processes, and the advantages claimed for them are long life, low porosity, high conductivity and great economy. The electrodes are made by treating in the electric furnace amorphous carbon articles made up in the shape desired. The product is stated to be entirely free from amorphous carbon, and the percentage of impurity in the finished electrodes is given as 1 part in 1,000. The size of the electrodes is limited generally by the difficulties of manufacture. In rectangular shapes the cross section is limited to about 28 sq. in., and the length to 36 in. The width of a carbon is usually limited to 8 in. In round carbons the length is limited to 36 in., and the diameter to 5 in. These limits can be increased slightly when large amounts are ordered. The pamphlet mentions some striking results of tests made in Germany with Acheson graphite electrodes in the electrolysis of sodium chloride solutions.

GENERAL MINING NEWS.

United Mine Workers Convention.—The convention at Indianapolis is the largest in the history of the organization, and the biggest labor convention ever held in this country. There are 1,100 delegates in attendance, representing, it is said, nearly 300,000 miners. Delegates are present from 24 states, Pennsylvania, Illinois and Indiana sending the greatest number. The joint conference with the operators of Illinois, Ohio, Pennsylvania and Indiana begins February 1.

President Mitchell's report showed that from 1898 to 1901, the 4 years of his service, the membership increased from 32,902 to 198,024. The increase during the last year was 82,503. During the year 396 local unions were organized, 121 disbanded, leaving a net gain of 275.

He said that over $200,000 had been expended for strike benefits during the year. A special effort had been made to organize the West Virginia miners and there were 45 new unions in District 17. There is strong antagonism to the organization by West Virginia operators. The situation in the anthracite field was encouraging and he thought that the questions of an 8-hour day, recognition of the organization and a minimum day's wage scale should be the paramount issues there.

Secretary Wilson's report showed that during the year $79,478 were paid out as salaries to the officers and expenses of agents. The total expenses for the year amounted to $330,143. The receipts were $299,384. The order had on hand $127,807, leaving a balance on hand January 1, 1902, of $97,048.

The election of officers resulted in the re-election of President Mitchell, Vice-president Lewis, and secretary-treasurer Wilson.

The scale decided upon for the ensuing year demands an increase of 10 per cent absolute run of the mine. The differential between pick and machine mining is left at 7c., the figure fixed by the convention of 1901. The decision of the committee as to this differential was in the nature of a compromise with the Illinois miners and the delegates from other Middle Western States, who have favored a differential of 4c. The committee also includes in its report a demand for an increase of 15c. for inside drivers. The convention voted to use all its influence to secure the demands of the anthracite miners.

ARIZONA.

MOHAVE COUNTY.

(From Our Special Correspondent.)

American Flag.—This mine, on Wallapai Mountain, 15 miles east of Kingman, is about to be worked after a long idleness.

C. O. D.—This mine, in Todd Basin, has its new mill and equipments in fine shape, and concentrates are being shipped regularly.

Elkhart.—Owing to the long dry winter, lack of water has forced this mine and mill, near Chloride, to close down.

Paymaster.—This mine, near Mineral Park, belonging to County Treasurer Owen McNeeley, is showing some gold and silver.

Philadelphia & Arizona Mining Company.—This company at Chloride, will start its new 200-ton concentrating plant at the Minnesota Mine soon. Water for the mill has been developed in a new well, and the large reservoir is full.

Quartette.—This gold mine, on the Colorado River, has 20 men at work, and the 20-stamp mill is to start soon.

San Francisco District.—A new gold discovery has just been made 30 miles west of Kingman, by M. F. Wilkinson. Prospectors are rushing in to the new find, and the ground for miles around is being located.

Schuylkill.—W. D. O'Neil, superintendent of this mine at Chloride, has taken a bond and lease on a prospect from J. C. Swickard, near Nigger Head, and has 8 men developing it.

PINAL COUNTY.

Troy Copper Company.—The El Paso Smelter and Supply Company has a contract for installing a complete reduction plant at Troy, and the machinery is now on the way. The plant will consist of a 60-ton water jacket, hoist, air compressors. One hundred miners are reported at work and more will be required when the reduction plant is ready. The company has been doing development work for about 2 years.

YAVAPAI COUNTY.

(From Our Special Correspondent.)

Octave.—A bar of gold weighing 105 lbs. has been sent from this mine as the result of 5 weeks' work.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

Amador Queen No. 2.—A rich pocket containing $400 in gold was recently taken out of this mine by leasers. The property is near Jackson.

Argonaut.—Sinking is pushed on the mine, and 10 stamps of the mill are running one-half time on the ore, and one-half time on ore from the Hoffman ground, upon which the Argonaut Company has an option.

Little Sargeant.—A. Caminetti, who owns this and the Julian Mine at Middle Bar, is having a road built, and will soon start mining.

Zeila.—This mine near Jackson, is having the shaft repaired; 30 men are employed.

KERN COUNTY.

(From Our Special Correspondent.)

Copper Claims.—A. E. Redstone, of Bakersfield, has located a number of copper claims about 8 miles from Garlock.

Mammoth Coal Company.—This company with property at Garlock is developing its coal mines. The product is consumed by the milling plants and mines near Randsburg. An 8 ft. vein was recently encountered.

Pacific Oil Refining Company.—This company, which is erecting a refinery near Reeder Lake, has suspended operations pending a shipment of machinery. The company expects to have the refinery at work by March 1.

Queen Oil Company.—It is stated that a recent test of the well showed it was flowing 15,000 bbls. per day.

Smith Cyanide Works.—James A. Smith had another successful clean up at his cyanide works at Randsburg, the result for one week being a gold brick valued at $1,250. Mr. Smith also has charge of the cyanide plant at the Red Dog custom plant near Randsburg.

Sunset Railroad Company.—It is stated that a plan is on foot to extend this road through the interior of the Sunset District.

MONO COUNTY.

(From Our Special Correspondent.)

Almono.—S. G. Lines, of New York, has leased from the company, of which he is president, this mine at Coleville, for 2 years. Men are at work.

MONTEREY COUNTY.

(From Our Special Correspondent.)

Los Burros District.—R. T. Grant, of Monterey, has purchased some claims in this district, and is developing them.

NEVADA COUNTY.

(From Our Special Correspondent.)

Grizzly Hill.—This mine near Nevada City has had a new rock breaker installed, and operations continue with a good force.

State Ledge.—This mine 4 or 5 miles south of Grass Valley has been bonded to Marwick, White & Smart. The ore averages from $7 to $8 per ton, and is 4 ft. between walls. A 10-stamp mill is on the ground, and it is intended to erect a larger mill of later pattern in a short time.

Sunflower.—This mine, on Slate Creek, has started with a 5-stamp mill and a New Standard concentrator. A Sacramento company is working this property with Superintendent Ballou in charge.

PLACER COUNTY.

(From Our Special Correspondent.)

Compagnie des Mines d'Or du Long Canyon.—The drift mines at Ralston Divide owned by this company, A. Bordeaux, of Auburn, manager, have been compelled to stop work for a time, owing to short water supply.

Mayflower.—The mill at this gravel mine, near Forest Hill, has started on a test run of gravel from the new channel.

Shady Run Quartz Mining Company.—This company at Shady Run, J. E. Fischer, superintendent, has about finished putting up a 10-stamp mill.

PLUMAS COUNTY.

(From Our Special Correspondent.)

Crown Point.—Lester & Gobert are putting a mill on this mine near Quincy.

SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

Gold Dollar.—Evan Davis, superintendent of the Associated Mines Developing Company, owning the Gold Dollar, Glen Ray and other mines near Victor states that as soon as the properties are further opened a 10-stamp mill will be erected.

SAN DIEGO COUNTY.

(From Our Special Correspondent.)

California King.—The railroad connecting the mines at Pichacho, with Yuma, is in course of construction. A dry crushing roller mill is to be used at the mines.

SAN LUIS OBISPO COUNTY.

(From Our Special Correspondent.)

California Copper Company.—The company has acquired a number of copper claims on the coast side of the mountains, between San Luis Obispo and Cayucos. They are about 6 miles from Morro.

Carl Mining Company.—This company at Klau, is employing 70 men, and steadily shipping quicksilver. This is a comparatively new field, in its first year of production. The Carl Mine produces about 85 tons of ore daily.

SANTA CLARA COUNTY.

(From Our Special Correspondent.)

Guadalupe.—This old quicksilver mine, near the New Almaden, has been leased by the owners, J. V. Coleman, Isabelle May, C. D'Andridge and E. F. Preston to H. C. Davey, for 5 years. The old shaft will be repaired at once. This mine has been closed down many years, but was at one time a large producer.

SHASTA COUNTY.

(From Our Special Correspondent.)

Hearon & Thierkoff.—M. N. Herron and A. W. Thierkoff who own a mine on Clear Creek, have bonded the property to F. W. Roberts for $6,000.

Iron Mountain.—A fire in the ore body has caused a temporary closing of this mine at Keswick. As there is a year's supply of ore on hand, the smelter will not close. It is expected the fire will be out soon or shut off.

Kangaroo.—Messrs. Dakin & Wiser are developing this mine in the Lower Springs District. The ore will be treated in the old Spanish Mill, which is being repaired.

Live Oak.—This mine 2 miles east of Keswick, is being worked by Bennett & Nason; 180 tons of ore have been shipped to the Keswick Smelter since July. Considerable development is being done, and a streak of ore in the tunnel is said to assay from $75 to $542 a ton.

McClure.—This mine near Bully Hill is now employing 7 men.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

Quigley Ranch.—This ranch at Oro Fino has been bonded through David Jones, and the ground is to be tested for dredging.

SOLANO COUNTY.

(From Our Special Correspondent.)

St. Johns.—At this quicksilver mine at Vallejo, which recently changed ownership, the main shaft is to be sunk deeper. Superintendent Alf. Tredidgo will work 20 men.

STANISLAUS COUNTY.

(From Our Special Correspondent.)

Alo.—The new 40-stamp mill on this mine, T. M. Lane, superintendent, will shortly be operated by electrical power from Knights Ferry.

Golden West.—The mill on this mine at Sonora, has again started. F. R. Restano is superintendent.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

App.—This mine on Quartz Mountain is running full blast, employing 75 men. Forty stamps are dropping day and night on excellent ore.

Atlas.—The shaft of this mine, at Tuttletown, is being reopened, and will be sunk to 600 ft.

Belleview.—This mine at Columbia is soon to resume work.

Clio.—This mine at Jacksonville has been shut down on account of disagreement, as to the development work necessary.

Driesam.—What is supposed to be a continuation of the rich shoot in the upper levels of this mine near Sonora has been exposed in an upraise from the 400 ft.

Golden West.—This property on what is known as the Comstock place near Columbia, is employing a large force. The new mill will soon be running.

Green.—This mine at Saw Mill Flat, near Columbia, is being reopened under the superintendency of J. S. Hamilton.

Green Jumper.—Work has been resumed at this mine near Confidence.

Grizzly.—At this mine at Carters, W. R. Hall, manager, a new hoist capable of sinking 2,000 ft. is to be put in.

Mapes.—This gravel mine at Yankee Hill, near Columbia, is running full blast. A steam hoist is being erected, and it is said a large body of fine looking gravel is on hand.

Prudhomme.—The shaft is to be deepened. The mine is showing some fine ore in the present workings.

Rawhide.—The chlorination mill is being put in shape. Eight tons will be the daily capacity of the 2 chlorination plants when the old plant is working again. About 90 men are employed at the mine.

Santa Ysabel.—A large vein of good grade ore is reported struck in this mine near Sonora.

Shawmut.—New machinery is being installed at this mine, 2 1-2 miles northwest of Jacksonville. Over 200 men are working on the mill and placing the machinery.

Soulsby.—An air compressor has been installed at this mine, at Soulsbyville. Mr. Sharwood is superintendent.

Wheal Perrin.—This mine at Soulsbyville has been secured by Hal. J. Sisty, on a bond for $15,000, and 15 per cent of the gross output until the mine is paid for.

TRINITY COUNTY.

(From Our Special Correspondent.)

Sweepstake.—The new pipe lines are completed from the East and West Weaver Creeks to this mine near Weaverville. The ditch and pipe will be continued next season to the other sources of water supply. Frank H. Hall is general manager.

YUBA COUNTY.

(From Our Special Correspondent.)

Miller.—The new mill of this mine, Mr. Widmar, superintendent, will shortly be at work. The mine is in Yuba County, but the nearest post office is at Forbestown.

Victor.—These gold mines at Browns Valley, including the Dannenbroge, Pennsylvania, Hawkeye and Jefferson, as well as the land owned by T. J. Hibbert, are under bond to Englishmen, and the old mines are to be opened and worked under the management of Lindsey Scrutton, who has been in charge of mines at Oroville. It is understood that the conditions of the bond require an expenditure of $50,000 on development in 18 months. There is a mill on the properties.

COLORADO.

CLEAR CREEK COUNTY.

(From Our Special Correspondent.)

Big Five Association.—The German Mine at the head of Virginia Canon has been bought in but will

not be worked until the tunnel being driven reaches the vein.

Empire Tunnel and Gold Mining Company.—The tunnel at Empire has been widened and air drills are used at the heading which is now in about 800 ft. The tunnel is 8 by 8 ft. in the clear. Water power drives the compressors. The company owns 69 lode claims and 51 acres of placer.

Kaverne.—A tunnel is being driven from near the mouth of Mill Creek to cut the lode at greater depth. Machine drills are used and the tunnel has been driven between 500 and 600 ft. The shaft and mill will probably remain idle until this connection of over 1,000 ft. can be made.

Kelly Tunnel.—The boilers and compressor have arrived for this bore at Georgetown. The buildings are up and it is claimed air drills will be working early in February. Two shifts are driving the tunnel into Democrat Mountain by hand.

Little Mattie Company.—The company has put in a new air compressor and will run an air pipe line from the mill to the Mattie Mine and also intends to work 100 men developing the Newton and Mattie.

Lucania Tunnel.—Colorado Springs people have begun the tunnel on Fall River to reach the mines in Bellevue Mountain. Present work is by hand but machinery is to be added in April.

Marshall-Russell Tunnel.—An air compressor manufactured by the Western Tool Company of Denver has been purchased. The water wheel is in and the building ready for the compressor. The flume has been built, taking water from Clear Creek. The tunnel has been heavily timbered for over 200 ft. It is double track 8 by 8 in the clear, water box underneath 2 ft. wide and 18 in. deep. The company owns 54 patented claims, 10 locations and 2 mill sites. The tunnel will be driven into Miller and Covode Mountains at Empire Station and will be 7,750 ft. long. W. C. Marshall, of Empire, is manager.

Occidental Development Company.—In sinking a rich streak of ore worth $300 a ton has been cut at the 5th level. The high grade streak is 10 in. wide and the second class 12 in.

Oil Prospects.—The discovery of oil in various parts of the State has caused work to begin on a well not far from the Jefferson-Clear Creek County line near Morrison. Ranchmen are also organizing a home pool.

Old Town Mining and Milling Company.—Leasers made a shipment of 43 tons to the Idaho Springs mills, thinking the ore was a concentrating proposition, but returns showed values of almost $50 per ton. The ore will be shipped to the smelters hereafter. G. H. Kimball, Jr., Idaho Springs, is manager.

Red Oaks County.—The tunnel is being driven under contract. The company is stoping ore in the Sceptre vein. The mill is running days and doing good work. Its earlier operation is claimed to have been under poor management.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Mining Deeds and Transfers.—Mrs. T. W. Roberts et al. to S. T. Harris et al., the Portage lode, Russell District; Estella True Nell to E. A. Chapman, 1-4 interest in Pet lode, Silver Lake District; F. S. Stephens to the S. & F. Mining Company, the Grand Union and Golden Slipper lodes, Pine District; T. E. Inglis to F. Arms, the Castle Rock lode, Quartz Valley District; J. R. Quigley et al. to S. and L. Sternberger, 1-2 interest in Ipava lode, and the C. H. Smith placer claim, Russell District; J. H. Le Moyne to H. S. Walde, 1-4 interest in the Waltham lode, Russell District; Frank Cole to Frank O'Neill, 1-4 interest in the Roosevelt numbers 1, 2 and 3 lodes, Enterprise District.

Banta Hill Consolidated Mines Company.—At the annual meeting in Denver, on January 13, the old officers were re-elected as follows: Henry Mustin, of Philadelphia, Pa., president; R. L. Martin, Central City, vice-president and manager; William Curtis, New York City, secretary and treasurer. The above with W. H. Curtis and John Livezey constitute the directorate and executive committee. It is understood that the company is considering the settlement of its difficulties, and an early resumption of work. The property is considered one of the biggest propositions in the county.

Chemung-Belmont.—A Black Hawk pool is keeping up a regular output of milling ores, running from 2 1-2 to 4 ozs. per cord, the smelting ores going from 3 to 5 ozs. gold per ton. N. G. Mitchell, Black Hawk, is superintendent.

Clear Creek Reduction and Mining Company.—The new Leyner air compressor for the Saratoga Mine was damaged in transportation. When the compressor is installed the company will carry on much heavier developments and will push for connections with the Newhouse tunnel. F. R. Carpenter, Golden, is manager.

Continental Mining Company.—A shipment of 6 tons of ore from the new strike in the 120 east level, gave 6.22 oz. gold, 10.4 oz. silver, and 4 per cent copper, or about $140 per ton. B. M. Myers, Central City, is manager.

Eagle Milling Company.—A new 80-h. p. boiler is being installed at the Eagle Mill on North Clear Creek. W. H. Coffin, Black Hawk, is manager.

Foot & Simmons.—Omaha men are overhauling the machinery, and building, and will retimber the shaft 400 ft. The property is on Bobtail Hill, has a good record and the new operators intend to install a gasoline plant and develop. Howard Higginbotham, Black Hawk, is in charge.

Gower Mines Company, Limited.—In sinking a good strike is reported, carrying values of over $100 per ton, and showing the usual proportions of lead, with gray copper, instead of chalcopyite. Output will be curtailed during sinking, ores being only taken out in development. Englishmen are interested with T. Dunstone, Black Hawk, superintendent.

Hayes & Wheeler—Local parties have taken a lease and bond on this property in Illinois-Central District, have unwatered the shaft, and will sink. J. Lowrey, Russell Gulch, is in charge.

Kansas-Burroughs Consolidated Mining Company.—The December shipments were 292 cars, or 2,485 tons. The output is curtailed of late on account of sinking the Phoenix-Burroughs shaft, which is now down over 1,400 ft. P. McCann, Central City, is manager.

Lilly.—Stewart & Cundy of Black Hawk, have opened in the tunnel level some silver ore which carries value at the sampling works of 59 oz. per ton, besides nearly an ounce in gold.

Mingo Gold Mining Company.—This company has purchased the Williams Crossing lode, adjoining its Mingo group in Lake District. Sinking on a lift of 100 ft. in the Mingo will begin, and active developments are to be carried out. A. Drake, Central City, is in charge.

Next President.—London and local parties own this property which is worked very successfully by lessees. Mill ore recently treated gave values of about 7 oz. gold per cord. G. H. Ellis Smith, Central City, is in charge.

Town Topics Mining Company.—An extension of the lease on the East Notaway has been given for 3 months, at which time the company will no doubt take it up. The company has declared its 4th dividend of $5,000, bringing the total up to $20,000 in the past year. M. D. Draper, Central City, is in charge.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

Coronado Mining Company.—Shipments average 75 tons daily of iron ore from a very large low-grade deposit. Heavy pumping is necessary.

Diamond Mining Company.—The new shaft is down over 1,000 ft. and drifting will start for the sulphide shoot found in the Resurrection. Philadelphia people are at the head of the enterprise.

Evelyn Mining Company.—A large plant of new machinery has been ordered and as soon as it is in place work will be pushed.

Fanchon Mining Company.—The new shaft to catch the Dinero vein is down over 100 ft. and another 150 ft. should catch the main vein. A number of sub-leases are giving good returns.

Greenback Mining Company.—The property has increased its sulphide shipments from 50 to 175 tons daily. There is a very large amount of ore in sight.

Leadville Tunneling and Drainage Company.—This company west of the city limits, after sinking a new shaft 150 ft. is prospecting with a diamond drill.

SAN JUAN COUNTY.

(*From Our Special Correspondent.*)

American Basin.—The rich strike reported recently is now fully confirmed. The vein is 12 ft. wide, and carries a rich streak 14 in. wide, showing sylvanite. It is apparently an extension of the Mountain King vein. The ore is shipped to White Cross station, and from thence to valley smelters. The Sunnyside Extension, formerly a high grade producer, lies on the same vein.

Aztec Mining Company.—A 12-h.p. gasoline engine has been put in at this mine near Silverton to run the electric drills. The tunnel is now being driven on the Aetna vein and the Aztec vein, will also be developed. Several streaks of very high grade ore have lately been encountered.

Bald Eagle.—Good silver ore has been encountered in the lead vein.

Baudora.—G. Heise et al., have resumed operations on this property near Silverton, formerly a big producer.

Emerald Lake.—This tunnel has been driven 600 ft. and is now in a 16-ft. vein of sulphide ore. A new mill is to be built by the owner, Ephraim Lissner, near Needleton in the spring.

Irene.—A 150-ft. contract has been completed, and another has been let for driving an upraise. Shipments will proceed as soon as the upraise is completed.

Kankakee.—A large body of sylvanite and calaverite ore is reported found in this mine in the eastern part of the county. The mine is owned by a Denver company, of which Joseph Frank is president. A cyanide plant is to be erected.

Last Chance.—This property in Dry Gulch, will ship ore to a matte smelter in the spring. Considerable ore is in sight, which carries a good excess in iron.

Menominac.—Webster C. Davis et al. have secured a 3 years' bond and lease on the Menominac, Aurum and Mabel M. claims, near Silverton. The ore in sight is shipping grade, but the entire product will be milled. The bond calls for $10,000 on each claim.

R. E. Neigold.—This property near Silverton will employ men all winter, supplies having been laid in. The east drift of the lower workings will be driven several hundred feet.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

Consolidated Mines Company.—A. T. Holman and F. L. Seigal, connected with the Vindicator Company and A. C. Adams, of Boston, have started work on their lease on the Grotto and Accident properties of this company on Bull Hill. The property embraces valuable land adjoining the Wild Horse and contains the extension of leads that have yielded well. The lease runs for over 2 years and the entire property will be extensively developed.

Elkton.—It is reported that the output is over 100 tons a day. The water at the 700-ft. level has almost disappeared and drifts are being extended north and south. The company intends to cut a large station at the 800-ft. and put in pumps capable of raising 4,000 gal. a minute. This will take some time, but the production will not be curtailed as there is a great amount of ore in sight in the upper levels.

Golden Dale.—At a special meeting of the stockholders in Cheyenne, Wyo., out of 3,000,000 shares, there were represented 2,600,000 shares. The meeting was called for the purpose of voting on the proposition of giving a $75,000 bond on the company's Alsa R. claim to F. H. Maynard, of Utica, N. Y. The stockholders ratified this action and Mr. Maynard will have the bond executed at once. He is a large stockholder in the Moose Company and decided to try on his own responsibility to open the ore. He has been conducting extensive work in the 1000-ft. level and in order to make sure of the ore shoot has secured leases and bonds on adjoining territory, including the Alsa R. and the Kentucky Belle.

Matoa Company.—It is reported that W. S. Stratton has consented to lease the Half Moon claim, and that a local company will shortly start work. The property was operated a few years ago by lessee Carl Johnson, who made considerable money as it was a great producer. The shaft is over 1,000 ft. deep.

Mint Consolidated.—The stockholders of the Mint, Mollie Dwyer and Union Belle Companies held a meeting this week, at which the consolidation of these companies took place, without the inclusion of the Pointer Company. President Foley states that work will shortly be resumed in the Mint shaft. While the deal was pending, work was suspended.

IDAHO.

CUSTER COUNTY.

(*From Our Special Correspondent.*)

Lucky Boy.—This mine at Custer City is working a full force of 70 men and treating 75 tons of ore per day in its mill and cyanide plant. Most of the ore is coming from the third and fourth levels and is yielding better results in the cyanide tanks than ever. The old method of treating the ores of Custer by dry crushing, roasting and pan amalgamation, which used to cost $16 per ton, was abandoned several years ago and, under the management of Henry A. McCormick, has been replaced by wet crushing, plate amalgamation, concentration and cyaniding. These precious metal values are half gold, half silver, and the cost of treating the ore has been gradually reduced to $2 per ton with a saving of 90 per cent of the silver and 97 per cent of the gold.

The new shaft at the Lucky Boy will be down to the eighth level by spring.

IDAHO COUNTY.

Thunder Mountain Mining and Milling Company.—This company has been organized by a party of Spokane men to operate a property in the Thunder Mountain District. The company is capitalized for $50,000, and the trustees named to manage the concern for the first 6 months are: James W. Shearer, James H. Conklin, John B. Johnson, J. F. Pasold, E. A. Patrick, L. L. Jones and F. W. Girand.

The property is 55 miles southwest of Warren. It is the intention of the company to commence work on the mine in the spring and to erect a 10-stamp mill.

SHOSHONE COUNTY.

Hecla.—This mine near Gem has resumed operations in a small way. The mill at Gem has not started. The ore will be concentrated in the Standard Mill.

Oro Grande Mining Company.—This company with headquarters at Orofino, has filed articles of incorporation. The capital stock is fixed at $1,000,000 of the par value of $1 per share. The company is formed to work deep placer ground north of Pierce City, on the Oro Grande, a tributary of the north fork of the Clearwater. The incorporators are H. L. Gray, C. C. Smith, F. P. Mesick, O. A. Anderson and E. A. Holmberg, all of Orofino.

INDIAN TERRITORY.

CHOCTAW NATION.

(*From Our Special Correspondent.*)

A company of St. Louis, Mo., men are to build an electric car line through South McAlester to connect McAlester, Krebs, Buck, Alderson, Haileyville and Hartshorne. This will make a joint population of nearly 50,000 people from which to draw business. Work on the line will begin within a few weeks.

New Coal Companies.—On the branch of the Missouri, Kansas & Texas Railroad running west from McAlester, the following companies are operating: Bolen Darnall Coal Company, Samples Coal and Mining Company, Valley Coal Company, McEvers Coal Company, McAlester Choctaw Coal and Mining Company, McAlester Coal and Coke Company.

Several more openings are to be made within the next few months in that vicinity. The thing most needed is a large washer for the slack from the various mines, and a set of coke ovens to turn this washed slack into coke.

IOWA.

WAPELLO COUNTY.

Lost Creek Coal Company.—At this company's No. 2 mine near Eddyville on January 24, while about 100 men all told were busy on surface or below ground, a blast set fire to the dust in one of the headings and a terrific explosion followed. The flame swept through the workings and out of the shaft, doing much damage and causing heavy loss of life. The mine caught fire but the flames were easily extinguished. The bodies of 21 men were recovered and 5 men were seriously, if not fatally, burnd.

KANSAS.

CHEROKEE COUNTY.

(*From Our Special Correspondent.*)

Zinc Ore Strikes.—The zinc excitement in the south portion of this county is unabated. The location of the present strikes was thought to be entirely out of the Missouri-Kansas zinc belt, but in drilling for a well 22 ft. of fine zinc ore was struck. The surrounding land has been leased and drills are to prospect it.

KENTUCKY.

CHEROKEE COUNTY.

(*From Our Special Correspondent.*)

HOPKINS COUNTY.

Monarch Mining Company.—This company's property at Madisonville, was sold recently to James R. Rash, trustee, who has since organized the Victoria Mining Company, capital $25,000, to operate the mines on a more extensive scale. The property consists of a coal mine, general stores and several hundred acres of coal lands. The Monarch Mine employs about 150 miners.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(*From Our Special Correspondent.*)

Baltic.—A surveying crew in the employ of the Copper Range Railroad Company is making a preliminary survey for a line to connect the Baltic stamp mill with the track leading to the other mills on the shore of Lake Superior.

Centennial.—The Nordberg hoist for "A" shaft is on the ground, and the work of installing has begun. The engine has cylinders 32 in. by 72 in., and is capable of hoisting from a depth of 6,000 ft. The engine will be housed in a stone building, 50 by 70 ft. "A" shaft is now down 1,700 ft. and "B" shaft 1,100 ft.

Copper Range Railroad.—The report that this line will be extended from Houghton to Calumet in the spring is revived.

Old Colony.—Diamond drill operations continue. The force employed numbers about 35 men.

Oneco.—Explanation work at this property was suspended for the winter some time ago.

Torch Lake.—This property is idle. It has been prospected with the diamond drill.

Trimountain.—An average output of 480 tons of rock per day is maintained. Surface improvements are about completed.

COPPER—KEWEENAW COUNTY.

(*From Our Special Correspondent.*)

Isle Royale Island.—This island, about 50 miles out in Lake Superior from Houghton, will be explored the coming summer by the Isle Royale Land Corporation, Limited, of Liverpool, Eng. This company owns about 150 square miles of the surface of the island, and will explore with a diamond drill.

MINNESOTA.

IRON—MESABI RANGE.

(*From Our Special Correspondent.*)

The Eastern Minnesota road, which has been exploring for some time in section 16, T 56, R 23, has found a considerable depth of good ore at over 200 ft. depth. This is one of the most westerly finds of good ore upon the Mesabi.

C. A. Congdon is exploring the lands of the old Lackawanna Company, in section 23, T 57, R 22, where some ore was found years ago under the slates. He is also drilling in section 8, T 57, R 22, north of the Stevenson Mine, on State lands.

Buckeye.—All these lands in section 36, T 56, R 25, belonging to the State of Minnesota, have been taken by M. L. Fay, under an option that calls for a bonus of $60,000 to the present lessees. He has also secured surrounding lands in 31, T 56, R 24, and in 1, T 55, R 25 on a 20c. royalty, and larger minimum than the state's. Ore was found in the Buckeye some years ago, but it is said to be very siliceous.

Corrigan, McKinney & Company.—This firm has an option on the Sibley & Barager lands in section 22, T 58, R 20, where the Belliton Mountain Iron Company found about 1,500,000 tons of ore some months ago, and will verify ore reports pending a purchase of the lease. It carries a 50,000-ton minimum and is a 15 and 25c. lease.

Pickands, Mather & Company.—This firm, owning the lease of 200 acres in the north tier of sections 4 and 5 T 58, R 17, is commencing to open the property by shafts. Two shafts each 2-compartment, will be sunk. The new mine is to be called the Minorca and will probably be a shipper this year. The tracks of the Duluth & Iron Range Road already reach it.

Sharon Ore Company.—This company's mine is pumping about 1,300 gal. of water a minute and has sufficient capacity for 3 times as much. Three diamond drills working on ore are finding a very important addition to the north and south, and the limits of the deposit are not yet determined. The mine is hoisting only so much ore as is necessary for opening the ore body for milling the coming season.

Stevens.—Work here has stopped for the winter.

United Steel Corporation.—The mines at Hibbing went into the winter with no stock except at the Day, where there were 75,000 tons on surface, at the Clark, where there was about 50,000 tons, and at the Pillsbury, which had a small amount. The mines now working about Hibbing are the Hull, Rust, Burt, Sellers, Pillsbury, Clark and Chisholm. The latter two were taken January 1 from the American Mining Company (American Steel and Wire). The Burt will be practically a new mine this year, and the East Pillsbury will be an addition. Underground development is very extensive, and there are in the group 10 operating shafts. Electric haulage plants are being installed at some of the properties, and more will be.

IRON—VERMILION RANGE.

(*From Our Special Correspondent.*)

Minnesota Iron Company.—This company at its Soudan hard ore mines is employing about 550 men, and operating day and night. Two large stockpiles are accumulating; more ore will be on surface at the opening of navigation than last spring. Several ore lenses have been opened in drifts that have been practically abandoned. A shaft has been sunk 300 ft. into the ore found a year ago by drill from Montana shaft and the bottom has not been reached. The ore is high grade, much better than at some of the recently opened finds. No steps have been taken to reopen the old Lee shaft. The mine is provided with ore for some years, and its life looks longer than two years ago. The company is working 8 diamond drills in and about the mine.

Section 30.—By a decision of the United States Supreme Court the ownership of a large part of section 30, T. 63, R. 11, is finally settled. This land has been in the courts since the discovery of iron ore indications there by an explorer for the Minnesota Iron Company in 1881. It is estimated that more than $500,000 has been spent in litigation and other expenses, and as yet there has been little exploring done to determine the value. Under the decision of the Supreme Court, in the case of F. W. Eaton et al. vs. the Germania Iron Company, the ownership to 7 40-acre tracts is closed as follows: In Frank W. Eaton 12-36, in Richard Fagan 6-36, in Leonidas Merritt 9-36, and in Geo. N. Lornstorf 8-32. The legal firm of Towne & Harris gets from Eaton and Lornstorf 1-9, and J. L. Washburn, attorney for Merritt and Fagan, about the same. All these parties with the exception of Lornstorf are Duluth men. The Germania Iron Company, loser in the final contest, is largely owned by A. M. Miller, a resident of New York City. The Minnesota Iron Company was for years a contestant, but dropped out 2 years ago, when Merritt & Eaton, who were the original locatees, were permitted to come back into the case, after having been for 17 years completely out of it. It is understood the successful claimants have had an offer from a leading steel company of a lease at a royalty of 50c. a ton and a small cash bonus.

MISSOURI.

DADE COUNTY.

(*From Our Special Correspondent.*)

Underwriters Land Company.—This company recently organized with a $1,000,000 capital, has begun by installing an air compressing plant on its Golden Rod property. The company is expected to do a large amount of work within the next 6 months.

GREEN COUNTY.

(*From Our Special Correspondent.*)

Lead Ore Strike.—Hayden & Company have discovered a large body of level ore on the Duncan land. The Ash Grove Company has developed one of the best paying zinc properties of the district in the same neighborhood.

JASPER COUNTY.

(*From Our Special Correspondent.*)

Joplin Ore Market.—Snow and rain caused many plants which were unprotected to cease operations a few days and prevented much ore in the bins from being sold. The output, however, was normal, and the prices remain good. Although the top price for zinc ore is off 50c. from the preceding week, the lower grades are practically unchanged. The lead ore market remains unchanged. Lead ore is so frequently associated with zinc ore that with the present prices for zinc ore the lead ore production remains good. The local lead smelters were the heaviest purchasers during the week.

The Standard Acid Company, with a natural gas smelter at Iola, Kans., will probably be a regular buyer of zinc ore from now on.

The highest price paid for zinc ore during the week was $29.50 per ton, upon a straight bid. Lower grades of ore brought $27 per ton for 60 per cent ore, which, in proportion, is $2 above the top price paid. During the corresponding week of last year zinc ore's top price was $27 per ton, upon a straight bid. Lead ore brought $21 per 1,000 lbs. delivered. During the corresponding week of last year lead ore brought $22.50 per 1,000 lbs. delivered.

The sales for January aggregate $665,178, which is in excess of any previous January in the district's history.

Much prospecting is going on, and railroad spurs now in course of construction will develop much virgin territory during the coming summer.

Following is the turn-in by camps of the Joplin District for the week ending January 25:

	Zinc lbs.	Lead lbs.	Value.
Joplin	3,150,200	392,970	$52,356
Galena-Empire	1,220,660	143,530	18,882
Carterville	1,357,760	240,310	23,377
Aurora	849,080	34,410	9,359
Oronogo	423,390	55,800	7,082
Neck City	467,760	....	6,783
Carthage	440,790	....	6,291
Zincite	403,120	3,510	5,919
Webb City	529,350	27,550	7,725
Duenweg	207,580	11,700	3,151
Granby	199,000	47,000	2,795
Spurgeon	97,980	64,210	2,625
Carl Junction	199,510	....	2,893
Cave Springs	128,490	8,810	1,984
Total	9,674,670	991,180	$151,192
Total corresponding w'k 1901	9,561,400	1,150,650	$137,265
Total since Jan. 1	41,247,230	5,411,680	$665,178

JEFFERSON COUNTY.

(*From Our Special Correspondent.*)

Mammoth.—This mine is again actively worked, through 2 shafts, while a third shaft is being sunk. A new mill is treating the lead ore exclusively with very remunerative results.

NEWTON COUNTY.

(*From Our Special Correspondent.*)

Granby Company.—This company is sinking the deepest prospect hole of the district near Granby. The contract is for a hole 3,000 ft. deep, and the prime object is water. The hole is now down about 600 ft.

Zinc Silicate Strike.—A company operating near Granby has, it is said, developed a body of silicate 15 ft. high by 18 ft. wide. An offer of $2,000 was made for ¼ interest in 2 lots upon which it is located.

ST. FRANCOIS COUNTY.

(*From Our Special Correspondent.*)

St. Francois Company.—The members of the Whitney-Ryan syndicate are inspecting their extensive interests in this lead district, as also their new smelter at Alton, Ill.

WASHINGTON COUNTY.

(*From Our Special Correspondent.*)

Washington County Mining Company.—This com-

pany has been organized with a capital of $1,000,000 by local and Eastern parties. The lands are near Cadet, and the company proposes to mine both lead and barytes.

MONTANA.

BEAVERHEAD COUNTY.

(From Our Special Correspondent.)

Montana Oil and Fuel Company.—The drill of this company in Smallhorn Canyon, has reached a depth of 230 ft. It is said by the operators that the indications of oil are increasing with depth.

Pappoose.—A bond has been taken on this Birch Creek property by S. J. Dennis of New York, running to August 1. The amount called for in the bond is $6,000. The claim is about 6 miles from Apex.

FERGUS COUNTY.

New Year Gold Mining Company.—The aerial tramway installed at New Year by the Montana Hardware Company is in operation. It is a gravity tram and cost to erect $17,500. The upper terminal at the mine is 602 ft. above the lower at the mill. It is the first aerial tramway to be erected in Montana.

(From Our Special Correspondent.)

North Moccasin Mining Company.—This corporation has filed its articles with the Secretary of State. The capital is $2,500,000. The incorporators are John D. Waite, A. H. S. Bird, A. S. Wright, A. W. Warr, W. C. Waldrof and W. C. Draper, all residents of the county. A check for the $875 to cover the State filing fees accompanied the papers. The mining operations will be carried on, on the North Moccasin in the vicinity of the new camp of Kendall.

FLATHEAD COUNTY.

(From Our Special Correspondent.)

Rocky Mountain Oil Company.—The Kintla Lake oil fields has another company added to the list of oil concerns. The capital stock is $62,000, of which $45,000 has been subscribed by citizens of Kalispell. The incorporators are Thomas Clifford, C. H. Foote, W. H. Griffin, A. L. Jacqueth, H. S. Cannon and others.

GRANITE COUNTY.

Sunrise Mining Company.—This company's properties are situated in Flint River Valley, about midway between Philipsburg and Drummond. The company is putting in a large cyanide plant. Frank D. Brown is manager.

JEFFERSON COUNTY.

Vautour.—This mine on Red Mountain, near Basin, is being worked under lease by D. J. Tallant and John Peterson. The owners are E. W. and G. D. Beattie. A steam hoist is in place and the shaft will be sunk to 300 ft.

LEWIS & CLARKE COUNTY.

(From Our Special Correspondent.)

Exploration and Mining Company.—A number of Helena business men have organized this company, with a capital of $1,000,000. Their object is to reopen a number of old abandoned mines near Helena, and interest outside capital. The board of directors are N. B. Holter, N. J. Gould, C. W. Whitley, A. H. Barret, Geo. E. Gunn, S. T. Kurtz, C. C. Newman, E. C. Babcock, Sherwood Wheaton, Henry Sieben and B. H. Tatem.

MADISON COUNTY.

Gold Discovery.—Rich gold finds are reported in the west end of the Norwegian District, about 25 miles from Pony. About 30 claims have been located and the country is swarming with prospectors.

Minneapolis-Montana Company.—This company, is organized under the laws of Nevada with a capital stock of $1,500,000. Charles C. Overmire, of Helena, is Montana agent. The company owns a number of claims on which, it is said, a large amount of development work has been done. High grade ore has been shipped, some of it to the East Helena Smelter. The directors and a majority of the stockholders are Minneapolis, Minn., men. The directors are C. S. Langdon, L. P. Chute, Henry L. Hill, W. C. Tiffany, Walter L. Badger, Joseph Hafflin and Robert L. Bruen.

PARK COUNTY.

(From Our Special Correspondent.)

National Park Gold Mining Company.—This company, with headquarters at Great Falls, has been organized to work 5 gold claims adjoining the Daisy property at Cooke City, just outside of the Yellowstone National Park. The capital stock is $100,000, divided into 1,000,000 shares of 10c. each. The incorporators are E. B. Judd, David Noble, R. E. Molt, Robert Noble, W. C. Hanks, John A. Largent and Richard Gies. The company claims to have 4 ft. of $40 gold ore. It is the intention to build a stamp mill in the spring. The property is 80 miles from the railroad at Cinnabar.

POWELL COUNTY.

Anaconda Mining Company.—The company's new reduction works at Anaconda opened for work on January 25. It is estimated that from 500 to 1,000 tons of ore will be treated daily.

SILVER BOW COUNTY.

Anaconda Mining Company.—The appeal from the order of Judge Clancy denying a petition for an inpute has been submitted to the Supreme Court. A little more than a year ago the Anaconda Company applied to the lower court for an order restraining the defendants from working the veins in controversy. The lower court denied the application for an injunction, and from that order the plaintiff appealed.

F. Augustus Heinze has already instituted another suit against the Anaconda Mining Company, in which he seeks permission to examine and survey the underground workings of the mine. He also contends that the Anaconda Mining Company is extracting ore from the Belmont Mine, which he asserts is his property.

NEVADA.

ELKO COUNTY.

(From Our Special Correspondent.)

White Rock Gold Mining Company.—With its ditches completed and the hydraulic machinery in place, this company, which owns 16 claims 46 miles northeast of Tuscarora in Borette Canyon, is prepared for washing. A large interest lately passed into the hands of a St. Louis syndicate, and the sum realized is to be applied to additional machinery and new flumes. W. D. Higgenbotham is manager. The company's office is in Salt Lake.

LINCOLN COUNTY.

(From Our Special Correspondent.)

De La Mar Mines.—At this company's plant at De La Mar, an 8-ft. Chilian mill has just been put in on trial.

NEW JERSEY.

WARREN COUNTY.

Marksboro Portland Cement Company.—This company has completed the purchase of two tracts of land, 800 acres in all, near Marksboro. These tracts have abundant supplies of marl and shale. Work is now in progress on the necessary buildings at Marksboro, and the machinery has been ordered for a plant having a capacity of 800 barrels of Portland cement a day. The main office is at 80 William street, New York. The officers are: President, H. V. H. Snyder, Paterson, N. J.; vice-president, Philip Scanlon, Newark, N. J.; treasurer, John Brooks, Boston, Mass.; general manager, C. J. Curtis, Marksboro.

NEW MEXICO.

DONA ANA COUNTY.

Mormon Mining and Milling Company.—This company is capitalized at $1,000,000. The officers are: Thomas B. Enochs, of Kansas City, Mo., president; William B. Sweezey, of Hastings, Mich., vice-president; and Louis B. Bentley, of Las Cruces, secretary and treasurer. The men who have been working the Mormon property are now adding 4 claims to it, all situated at Gold Camp, about 8 miles east of Organ. Work will continue on the Mormon.

LINCOLN COUNTY.

Free Gold Mining and Milling Company.—The incorporators and directors of this company are W. A. McIves, J. T. Cochran, Geo. K. Stigh, of Nogal; Geo. H. Martin, of Waterloo, Ia.; and E. H. Scott, of Burlington, Ia. The capital stock is $500,000. The company will work the Enterprise, Corker, Cracker Jack, Gold Bar, Ruby, O. K., Nannie Baird, Mollie Gibson and Side Issue lode claims in the Nogal Mining District. The offices of the company will be at Nogal.

SANTA FE COUNTY.

Santa Fe Mining Company.—At the annual meeting in Jersey City, N. J., the following directors were elected: J. H. Susmann, Edgar Buffman, Adolph Lewisohn, Charles W. Welch, W. A. S. Chrimes, Charles S. Henry, Leonard Lewisohn, A. S. Bigelow, Edward C. Westervelt. 128,828 shares out of the capital stock of 225,000 shares were voted. No smelting is now done at the mines owing to the uncertain condition of the copper market. Prospecting, however, is carried on. A large stock of ore is on hand which will be smelted as soon as favorable prices are reached for copper. Available cash for carrying on present work is stated to amount to $197,892. The metal production in 1901 is given as $222,255. The assets of the company according to the treasurer's report now amount to $436,397.

NORTH CAROLINA.

CABARRUS COUNTY.

(From Our Special Correspondent.)

Meadow Creek.—This gold mine produced 70 dwts. nugget gold one day last week as the result of 2 men's work. F. H. Manney, of Gold Hill, is in charge.

MONTGOMERY COUNTY.

(From Our Special Correspondent.)

Steel.—This old mine is being opened and examined under the direction of John T. Cramer, of Thomasville.

ROWAN COUNTY.

(From Our Special Correspondent.)

Rowan Gold and Copper Mine.—This mine, under the direction of R. D. Curd, of Salisbury, continues to produce and pile up ore on the dump pending a rise in copper.

OREGON.

JOSEPHINE COUNTY.

Baby.—J. R. & L. M. Smith sold their 1-2 interest in this quartz mine to Ed. F. Hannum (who was formerly half owner in the Greenback), and W. S. Town, recently from Cripple Creek, Colo. The other half interest is owned by H. G. Rice and J. L. Myers.

Hoosier Boy Gold Mining Company.—This company owns the Prairie Diggings group of 5 claims in Prairie City District. There are two tunnels 690 ft. and 500 ft. long, said to show $8 ore in 2 large veins. A 25-stamp mill has been erected. The company also owns the Buckhorn group in Kootenai County, Ida. Michigan men are interested and the officers are: E. J. Foster, Grass Lake, Mich., president; J. W. Messner, Saginaw, Mich., secretary; W. F. Shaler, Grass Lake, Mich., vice-president and M. D. Winder, Spokane, Wash., general manager. The company is incorporated with a capital stock of $1,000,000, in $1 shares.

Ida.—Don Rae and C. H. Codding have moved their Tremain mill from their Klondike property on Louse Creek to this property, owned by Turnham and Matthews.

BAKER COUNTY.

Columbia Gold Mining Company.—This Columbia mine is on Fruit Creek, a tributary of Cracker Creek, between the Golconda and the Eureka & Excelsior. A 20-stamp mill with 12 concentrating tables is capable of handling 60 tons of ore daily. The tailings are treated with cyanide, while high grade rock is shipped to the Everett Smelter. The mine developments amount to over 9,000 ft., there being 3 levels and a 500 ft. vertical shaft. The quartz carries 8 per cent. of sulphurets and the average value of the milling ore is given as $10 to $15 per ton. About 40 per cent of the gold is caught on the plates. The concentrates are said to run $100 to $225 per ton with considerable values in silver. By the treatment used about 95 per cent of the total values is reported saved, and the monthly output is given as over $75,000. Frank Baillie is general manager.

JACKSON COUNTY.

Ashland.—A strike of fine gold ore is reported in the main shaft of this mine at Ashland at a depth of 800 to 850 ft. On the 800 drifts are being run. Stoping continues on the 600 and 700 ft. levels. Milling has been restricted by lack of water.

Sugar Pine.—George N. Bolt bonded this mine some three months ago to C. R. Ray, of Gold Hill, who is driving the tunnel, now in 600 ft. A strike of good ore showing free gold is reported.

PENNSYLVANIA.

ANTHRACITE COAL.

Blacks Run Coal Company.—This company has begun testing its coal lands near New Kensington by bore holes. This company's holdings comprise over 40,000 acres, include purchases from time to time by A. B. Copeland, of Parnassus, and take in nearly all the territory lying between Verona and Parnassus, and extending as far back from the Allegheny River as Murrayville.

Lehigh Valley Coal Company.—Five men were caught in an explosion of gas at the Seneca Colliery, in Pittston, on January 23. Two died and three were burned severely. Benjamin F. Davis and J. W. Burke, of Wilkes-Barre died, and Thomas A. Jones, of Wilkes-Barre; John Lewis, of Plains, and Edward Langan, of Pittston, are suffering with burns.

Pennsylvania Railroad Company.—The company recently made an offer to purchase the capital stock of the Pennsylvania & Northwestern Railroad Company, in which the Berwind-White Company is interested, on the basis of $1,000,000 of Pennsylvania stock for $2,250,000 of stock of the Pennsylvania & Northwestern Company. At the present market price of the Pennsylvania stock this is equal to a little more than $33 a share for the Pennsylvania & Northwestern stock. The offer will be accepted. The Pennsylvania & Northwestern Railroad is about 65 miles long, running from Bellwood, Blair County, to the Punxsutawney soft coal region.

Philadelphia & Reading Coal and Iron Company.—This company makes the following statement for December and the 6 months of its fiscal year from July 1 to December 31:

	December.	Six months.
Earnings	$2,483,857	$15,305,238
Expenses	2,331,776	13,868,899
Net	$152,081	$1,436,339

For the 6 months the gross earnings increased $1,382,841, and the expenses $932,200; leaving an in-

crease of $450,641, or 45.7 per cent., in net earnings.

Silverton.—This colliery at Hazelton, under the superintendency of George Kuech, will be entirely remodelled. A large reservoir will be built along the mountain side to supply the town and colliery, and a number of new houses are to be built. With the present plan of improvements completed the shipping capacity will be doubled.

Susquehanna Coal Company.—This company, it is said, is erecting, near the Auchincloss Mine, near Nanticoke, a new breaker, to be 120 ft. high and 50 ft. wide, built entirely of iron and steel. There will be no boiler houses in connection with the breaker and the machinery throughout will be run by electricity. The breaker will have a capacity of about 500 tons a day and will employ about 200 hands.

Williams.—E. B. Sturges, of Scranton, has secured a controlling interest in this colliery, above Fishbach. He will take charge at once and will re-open the colliery as quickly as possible, retaining Superintendent T. H. Griffiths. Mr. Sturges also controls Pine Hill colliery, above Minersville.

BITUMINOUS COAL.

Frank F. Nicola and Charles Donelly, Pittsburg capitalists, have concluded a big deal whereby they acquire 12,000 acres of coal lands in Allegheny County, together with the West Side Belt Line Railroad. John S. Scully, president of the Diamond National Bank, was the seller, and the transaction involves about $8,000,000. The tract comprises all the city land between Carson street and the Monongahela River, including the Denny holdings, and the rest of the property owned by the Belt Line.

Bessemer Coke Company.—At a special meeting at Pittsburg officers were elected as follows: President, W. Y. Humphreys; vice-president, Joshua W. Rhoades; treasurer, Herman Griffin; secretary, William Harris. The board of directors chosen comprises the above officers together with E. H. Jennings, Dallas C. Byers and B. L. Martin. The stockholders authorized the building of 200 additional coke ovens at the company's plant at Griffen, in Fayette County, where 300 ovens are now in operation. Other improvements were also authorized at Griffen, the whole to cost $100,000. Besides the plant at Griffen the company is operating works at Buffsdale, Humphreys and Bradenville, in Fayette and Westmoreland counties.

Ellsworth Coal Company.—This company is preparing to sink 5 new shafts at Scenery Hill, near Washington. The company recently purchased 14,000 acres of additional coal land near its present holdings.

Evans City Coal Company.—The following officers have been elected: President, Andrew Wahl; secretary, J. E. Holbein; treasurer, Gus Griesbach; directors, Andrew Wahl, John Leise, J. E. Holbein, J. A. Eichert, Gus Griesbach. The company has decided to sink the first shaft on the David McElwain farm, and work has already begun.

Keystone Coal and Coke Company.—All of the Coulter & Huff coal interests are merged into this company. The companies interested are the Greensburg Coal Company, operating No. 1 and No. 2 mines south of Greensburg; the Hempfield Coal Company, operating northeast of the town; the Salem Coal Company, operating at Salemville; the Carbon Coal Company, the Sewickley Gas Coal Company, the Arona Gas Coal Company and the Madison Gas Coal Company, operating at Madison; the Claridge Gas Coal Company, operating at Claridge, and the Keystone Coal and Coke Company, the selling agents of all of the concerns. The directors of the new concern are George F. Huff, Lloyd B. Huff and Richard Coulter, Jr. The capitalization is $400,000.

National Mining Company.—This company, an offshoot of the United States Steel Corporation, has just concluded the purchase of nearly 500 acres of coal land in Washington County. It now controls nearly 8,000 acres in Allegheny, Westmoreland and Washington counties. All this land will be developed, making it practically independent of outside sources of supply.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

Alder Creek Mining Company.—The new cyanide plant on Yellow Creek is preparing to start. John R. Evans, of Portland, Ore., is chemist.

Belt Development Company.—The drift from the bottom of the 700-ft. shaft is in 200 ft., crosscutting the formation in the direction of the Homestake line. A cage has been placed in the shaft.

Father De Smet Mill.—The Homestake Company is crushing 450 tons of low grade ore a day in this mill, which started in October after being idle 8 years. The tailings are given to John M. Henton and Charles Henley, who concentrate and treat with cyanide. They will be permitted to handle the tailings until the Homestake completes the new cyanide plant at Gayville, which will not be until September.

Highland Chief.—The combination stamp mill and cyanide plant is treating 45 tons of ore daily. Ore is exposed in 4 places on North Spruce Gulch. It is hauled in wagons to the hill above the mill, and is conveyed the rest of the way by a gravity tram.

Pluma Mining Company.—The shaft is down 200 ft. and exposes a low grade cement ore. Sinking continues. The company is owned by Des Moines, Ia., men. and T. A. Harding, of Des Moines, is general manager.

Rossiter Cyanide Plant.—The mill is running under lease to John Lundberg, on ore from the Buxton and Big Bonanza, at Terry, owned by the Portland Company and under lease to Mr. Lundberg.

Spanish R.—A new air compressor has been placed at the shaft.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

Lulu Group.—Free milling ore is being taken out at a point 80 ft. from the shaft, on the ledge. The group belongs to Joseph McClure and is under bond to Minneapolis men.

Maloney-Blue Lead.—The drift is 50 ft. long. It starts from the main tunnel at 1,635 ft. from the entrance. The ore is mispickel, carrying gold and silver.

Montana.—Drifting has been resumed on the main vein in a drift started 15 years ago. The shaft machinery has been sold and removed. The stamp mill will be converted into a cyanide plant. The ground is owned by the Gregory Mining Company, ex-Governor Smith, of Vermont, being the principal owner.

Ohio-Deadwood.—The tunnel on the main ledge is in 55 ft. New boiler, compressor and air drills have been ordered.

St. Elmo Mining Company.—Otto P. Th. Grantz, of Deadwood, has purchased the stock belonging to the estate of the late F. M. Marsh, of Omaha, amounting to 82,134 shares, making him almost a third owner. The company is to be reorganized. The other owners are Mrs. R. H. Graves, D. M. Gillette and George V. Ayres, Deadwood, and J. C. McDonald, Hill City.

Tykoon Mining Company.—The bond has been taken up on the Ranger group of claims near Keystone. The company has also purchased the Ingram 20-stamp mill, that was built for custom work. A tunnel is to be driven from the mine to the mill.

Yellow Jacket.—Work is started and the old shaft is being unwatered. It is a silver-lead proposition. Some rich ore was taken out in the past, running 30 oz. silver and 60 per cent lead. The shaft is 100 ft. deep, and the vein 5 ft. wide at the bottom.

TENNESSEE.

FENTRESS COUNTY.

Col. C. P. Treat and Judge J. P. Haws, of New York, and W. S. Taylor, of Philadelphia, have bought 12,000 acres of splint bituminous coal lands in this county and will develop them. The land is within 20 miles of the Tennessee Central Railroad.

UTAH.

(*From Our Special Correspondent.*)

Bullion Settlements.—The silver-lead bullion shipped to the Eastern refiners by the Salt Lake Valley smelters for the week ending January 25 was valued at $59,900; copper bullion, $19,500. During the same period the banks made settlement on gold bars, $9,-816; cyanides, $8,800.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

Rob Roy.—The recent earthquake is said to have brought to light on this property the lost vein. Samples taken from about 3 ft. assay high in gold and silver. P. T. Farnsworth of Salt Lake is owner.

Cactus.—This mine near 'Frisco, owned by the Newhouse Syndicate, is down 444 ft. with a 3-compartment shaft to be sunk 600 ft. Sinking averages 3 ft. per day, hand drilling. On the 300 ft. level, drifting and cross-cutting is prosecuted.

Horn Silver.—From 'Frisco 5 cars of lead, silver, and copper ore have been been shipped to the Salt Lake smelters for the week ending January 25.

GRAND COUNTY.

(*From Our Special Correspondent.*)

Colorado Fuel and Iron Company.—This company owns 25 placer claims covering the best deposits of manganese ore in the county near La Grande on the Rio Grande Railroad. The ore is raked up, the largest boulders being broken, and shoveled into wagon cars which are hauled by traction engines to the railroad and consigned to the company's iron furnaces at Pueblo, Colo. Samples of the ore average: Manganese 39.8 per cent, iron .72 per cent; insoluble matter 12.18 per cent; sulphur, .6 per cent; phosphorus .018 per cent, water .21 per cent, with traces of carbonate of lime and magnesia.

IRON COUNTY.

(*From Our Special Correspondent.*)

Johnny.—Messrs Halloran & Clift, who bought an interest some months ago, report that the miners have struck within 300 ft. of the old bonanza shoot, a vein 5 ft. wide with streaks showing free gold. The shaft is down 240 ft. in 2 feet of ore, said to average about $50 gold per ton.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Tintic Shipments.—Shipments to the Salt Lake Valley smelters for the week ending January 25 are: Carisa, 5; Gemini, 11; Grand Central, 5; Lower Mammoth, 2; Mammoth, 7; May Day, 2; Tesora, 3; Uncle Sam Consolidated, 4; Victor, 8; Yankee Consolidated, 12; Tesora Mill, concentrates, 3 cars; total, 62 cars. In addition the Mammoth Mill shipped 2 bars of bullion. For the week ending January 17, shipments of ore were as follows: Gemini (Keystone), 11 cars; May Day, 2 cars; Yankee Consolidated, 6 cars; Carisa, 4 cars; Lower Mammoth, 2 cars; Mammoth, 4 cars; Tesora, 4 cars; Victor, 4 cars; Tesora Mill, concentrates 1 car. Total 38 cars.

Mammoth.—Two new strikes of ore have been made on the 1,800 and 1,900 ft. levels of this mine at Mammoth.

Sheba Mining Company.—This company is incorporated with a $150,000 capital in $1 shares. The officers are E. F. Hall, president; E. A. Kelly, vice-president; H. E. Rookledge, secretary and treasurer. They will continue to work a gold property embracing the Queen of Sheba, Luch Clayton, Queen's Minister, North Side, Leo, Queen's Babe, Cleopatra, and Croesus claims, with 2 mill sites and machinery in Spring Creek District. The mill machinery was purchased from an old property in Aurum, Nev., and has been costly to keep in repair. The mill will probably have new equipment. C. K. Rookledge, Ibapah, is superintendent.

Star Consolidated.—Mill tests in the Mammoth Mill at Mammoth on ore from this property are said to have given results as follows: Battery pulp, silver 8.4 oz.; gold, .20 oz.; lead, 4.4 per cent. The concentrates ran: silver, 25.4 oz.; gold, .68 oz.; lead, 30 per cent. The tailings assayed: silver, 3.6; gold, .06 oz.; lead, 0.6 per cent.

Swansea.—The shaft at Silver City is 1,018 ft. deep. Large bodies of low grade iron sulphides carrying lead and silver are exposed and a lot has been sent to Denver for experimental purposes.

SALT LAKE COUNTY.

Bingham Consolidated Mining and Smelting Company.—Edward L. White has been elected president to succeed J. A. Coram and Duncan McVichie has been elected general manager at Salt Lake to succeed O. P. Posey.

The construction of the converting plant is progressing rapidly. The company has completed a railroad from the Dalton & Lark Mines to connect with the Rio Grande Western and its smelters, greatly facilitating the handling of the ores. It is also building an electric tram to bring the ore from the Brooklyn and Miners Dream Mines to the Dalton & Lark tunnel. William F. Hammett, of Newton, Mass., has been elected a director to succeed D. M. Belches.

(*From Our Special Correspondent.*)

Commercial.—This property shipped 3 cars of copper ore during the week ending January 25.

Red Wing.—The first shipment of a lot of concentrates from the Silver Hill claim at Bingham belonging to this company was made January 23 from the Winnamuck Mill to the Salt Lake smelters. The ore carries 10 oz. silver, .05 oz. gold and from 12 to 15 per cent lead; 2½ tons ore produce one ton concentrates.

SUMMIT COUNTY.

(*From Our Special Correspondent.*)

Park City Shipments.—Following are the shipments for the week ending January 25: Ontario, 1,889,700 lbs.; Daly-West, ore, 1,655,600; Quincy, ore, 1,236,-050; Anchor, ore, 215,300; Silver King, 1,515,840; Mayne & Leonard, 52,445.

Gold King.—The incline on this property near Park City in the Snake Creek District is down 35 ft., the vein continuing in strength and richness.

Loring Brothers Mill.—This concentrating mill at Park City has closed for the winter.

TOOELE COUNTY.

(*From Our Special Correspondent.*)

Stockton Shipments.—Ore shipments for the week ending January 25 are as follows: Ophir, 27 cars; Stockton, 1 car; Steamboat, 1 car; Hidden Treasure, 2 cars; Pascoe, slag, 1 car; total, 32 cars.

Honerine.—The 3-compartment shaft of this mine at Stockton is sinking at the rate of 3½ ft. per day and has reached the 212-ft. mark. Sufficient funds for a mill and for sinking to a considerable depth have been placed in Walker Brothers' Bank, of Salt Lake, by P. L. Kimberly and associates of Sharon, Pa. E. J. Raddatz is superintendent and Walter G. Filer, manager.

VIRGINIA.

WISE COUNTY.

Colonial Coal and Coke Company.—This company, of Dorchester, recently purchased an additional tract of coal lands, amounting to 3,400 acres. The company expects to do business on a much larger scale and is to erect 300 more coke ovens.

WASHINGTON.

FERRY COUNTY.

(*From Our Special Correspondent.*)

Gold Ledge.—The tunnel is in 723 ft. Talc appearing frequently in the seams, the superintendent hopes daily to strike the vein.

Lone Pine-Surprise.—During 1901 over $6,000 was spent under the present management. The underground work was confined to a tunnel in 380 ft. and an upraise. The tunnel struck the extension of the Black Tail vein at 149 ft. in, 24 ft. wide, with 2 ft. of $20 ore, and the balance of no value. At 303 ft. in it struck the Lone Pine No. 2 vein, 12 ft. wide, 4 ft. of which assayed $8, and the other 8 ft. only $2 per ton. The tunnel followed the vein 31 ft. on quartz that assayed $5 per ton; at the breast the vein is 10 ft. wide, and 4 ft. of it assays $15.75.

Monroe.—After a long idleness work is resumed in the tunnel.

Oregon & Brunswick.—The shaft is down 30 ft., exposing 6 ft. of low grade quartz. Surface work on a cross vein shows low grade quartz running about $2.66 per ton. A tunnel is being driven for both veins. Four men are employed.

Oronoco Mining Company.—Five men on 2 shifts have finished a contract to drive a tunnel 300 ft. at this claim at Reno. The tunnel has run 2 ft. into the ledge, the width of which is unknown.

Primrose.—A new shaft has been sunk 50 ft., developing some small quartz stringers of indefinite value.

Princess Maud.—About a ton of very rich ore has been sacked from a new shaft on the American Boy fraction, and there are several tons of good ore on the dump. The boilers are being repaired preparatory to resuming work in the mine about February 1.

OKANOGAN COUNTY.

(*From Our Special Correspondent.*)

Bodie.—It is reported this mine has changed hands, and that control of the stock has been sold in the East.

Wauconda Gold Mining Company.—The main tunnel is in 1,025 ft. The mill is almost complete, awaiting only the installation of a few additional machines by which the ore can be concentrated before working in the amalgamating pans. A preliminary run in December showed that concentration could be used to advantage, increasing the capacity of the present mill to about 60 tons. The company is a Minneapolis, Minn., concern, of which Alexander Campbell is president; John B. Rossman, vice-president and general manager, and Arthur J. Edwards, metallurgist.

STEVENS COUNTY.

Meteor.—At this mine in Colville Reservation a postoffice has been established. Edgar Balling recently sold 3-4 of his interest in the claim and has bought the Adams adjoining. Howard Dennis, of Spokane, is to act as manager of the Meteor. The shaft is down 135 ft. on a vein of silver-gold ore.

WHATCOM COUNTY.

(*From Our Special Correspondent.*)

Great Excelsior.—New machinery is to be installed at this property, including a Rand 3-drill compressor, and a 5-ft. Cassel waterwheel.

WEST VIRGINIA.

MARION COUNTY.

New Central Coal Company.—This company is opening a new shaft on its Paw Paw property, 6 miles from Fairmont. The territory that is being opened up was purchased a number of years ago by Lonaconing, Md., men for $1 and $2 an acre. There are 2 veins of coal, 9 and 10 ft. thick respectively, both of which can be mined.

MARSHALL COUNTY.

Moundsville Mining Company.—A new company, made up of Wheeling men, has paid $100,000 for the Moundsville shaft and 700 acres of coal land belonging to this company. New machinery will be used by the new owners.

MINGO CCUNTY.

Pearl Mining Company.—This company has been organized at Richmond, Va., with John A. Clarke, of Fairmount, president. The concern has purchased coal properties west of the Thacker field from 8 different companies and will put in improved machinery and equipment of every kind. Charles T. O'Farrall, Jr., has been one of the prime movers in the organization.

War Eagle Coal Company.—This company, which A. Moore has been instrumental in forming, controls several tracts of coal land comprising 3,000 acres along the Norfolk & Western Railroad and taking in the heads of the branches of Guyan River, with 5 veins of coal ranging from 4 to 9 ft. thick. The land is in what is called the War Eagle field. Splint and gas coal will be mined.

FOREIGN MINING NEWS.

AFRICA.

RHODESIA.

The gold production for December is reported at 15,174 oz. crude, which is 1,313 oz. less than in November, but 5,801 oz. more than in December, 1900. The total reported for the year was 172,167 oz. crude, against 91,845 oz. in 1900, showing an increase of 80,322 oz., or 87.5 per cent. The total output in 1901 was equal to 153,229 oz. fine gold, or $3,167,243.

TRANSVAAL.

Bonanza, Limited.—This company reports for the month of December 8,082 tons of ore crushed. The yield was, from mill, 4,010 oz.; from cyanide works, 2,125 oz.; total, 6,135 oz., being an average of 0.76 oz. per ton milled.

Crown Reef Gold Mining Company.—This company reports for the month of December the following yield of gold: Mill, 3,770 oz.; cyanide works, 1,947 oz.; slimes, 160 oz.; total, 5,877 oz. The total receipts for the month were £20,610; expenses, £12,270; profit, £8,340. The average return per ton, reduced to United States currency was $10.76, and the expenses $6.41; leaving a profit of $4.25 per ton.

Geldenhuis Deep.—This company reports that in December 60 stamps were operated, crushing 8,360 tons of ore. There were 6,246 tons of tailings cyanided and 2,366 tons of slimes treated. The yield reported was: From mill, 2,530 oz.; from tailings, 1,156 oz.; from slimes, 215 oz.; total, 3,901 oz. fine gold. This shows an average of 0.47 oz. per ton crushed. The estimated net profit was £6,000 for the month.

Geldenhuis Estate.—This company reports that its mill was started up January 9, with 50 stamps.

Robinson Gold Mining Company.—In December this company reports 60 stamps working and 8,036 tons ore crushed. The yield was, from mill, 5,083 oz.; cyanide works, 2,065 oz.; total, 7,148 oz. fine gold; or 0.89 oz. per ton crushed. The net profit was £20,700 for the month.

CANADA.

BRITISH COLUMBIA—EAST KOOTENAY DISTRICT.

St. Eugene.—It is stated that the output of this mine at Moyie last year was 12,025 tons of concentrates. The net smelter returns are given as $272,362. Is is said the output was only about one-third of the possible production. It is said that about June 1 the mine may resume shipments. Meanwhile the development in the mine continues, about 12 men being employed.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Centre Star.—It is expected that shipments will be resumed about February 1.

Kootenay.—About 20 men are employed on development by contract. The drifts on the 400 and 600-ft. levels have gone ahead.

Le Roi.—The drifts on the 900-ft. level have been pushed ahead, and the preliminary work in the shaft at the 1,050-ft. level is almost completed. This will permit sinking at an early date.

Le Roi No. 2.—Stoping operations in the No. 1 and Josie mines are active, and that the mines have about attained the average tonnage to be produced weekly for the next few months. Development has been carried on steadily.

Nickel Plate.—Development work continues with good results.

BRITISH COLUMBIA—SLOCAN DISTRICT.

The total amount of ore shipped from the Slocan and Slocan City mining divisions for 1901, according to the New Denver *Ledge*, was approximately 30,000 tons. From January 1 to January 11 the shipments have been as follows:

	Week.	Total.
Payne	75	75
Ivanhoe	30	30
Sunset (Jackson Basin)	40	40
Reco	20	20
American Boy	20	20
Arlington	210	210
Hewett	65	65
Bosun	40	40
Total tons	500	500

NOVA SCOTIA—GUYSBORO COUNTY.

(*From Our Special Correspondent.*)

Richardson.—This mine at Goldboro has made improvements above and below surface. It has completed a standard gauge railway from its wharf at the head of Isaacs Harbor to the mine, a distance of 10,000 ft. The elevation from wharf to mine is 200 feet. The motor is a combined traction engine and hoist of 16 h. p. The engine is built to be used also as a hoist either at the mill or the wharf.

The new vertical shafts, 1,000 ft. east of the old hoisting shaft, is now down 120 ft.; quite 40 ft. of good ore has been cut, something entirely unexpected. An addition of 20 stamps is in place at the mill, making 60 in commission milling 120 tons per day. The average yield by amalgamation of about $3 is maintained. Recently J. R. Stuyvesant, of New York, has arranged to erect a cyanide plant to treat the tailings on a tribute basis, I understand that it was determined that the tailings carried an average of $2.30.

NOVA SCOTIA—HALIFAX COUNTY.

(*From Our Special Correspondent.*)

Brookfield Mining Company.—This company's property at North Brookfield has been sold to a group of capitalists from the United States, and the first payment of $30,000 was made January 9. The purchasers have 6 months to pay the balance. The property has been chiefly owned by Mr. W. L. Libbey, who has operated it for 8 years past, and has taken out over $500,000. It is the deepest gold mine in Nova Scotia, the main shaft being down 800 ft. There is a 20-stamp mill and a chlorination plant, and about 70 men are employed. The property was examined for the purchasers by Dr. George W. Maynard, of New York City, a well known mining engineer. Mr. Libbey will remain as manager for a time, and it is said that the new owners will push development work on a large scale.

Fouquoy.—This mine in Moose River District, under the new management of Robert Thaullach, has been brought back to something near its former productiveness, reviving the lagging spirits of its stockholders. Mr. Thaullach induced his directors to quit some of the old pits and pursue underground exploration. He found a new ledge 14 ft. wide, the first 56 tons of ore giving 396 oz. of smelter gold.

Waverly Gold Mining Company.—This company in Waverly District has returned in the past month 431 oz. from 2,289 tons of ore milled.

The results of the cyanide treatment of old tailings by J. R. Stuyvesant in a small plant in Cariboo District is 330 oz. returned from 5,495 tons treated. It is understood this return is but a portion of the gold secured, the final clean up will increase the yield to over $2 per ton. It is becoming quite evident that Nova Scotia must adopt the cyanide process to obtain the best results from its ores.

ONTARIO—LAKE OF THE WOODS DISTRICT.

(*From Our Special Correspondent.*)

Gold Star Mining Company.—This company has resumed work on its mine property at Mine Centre.

Log Cabin Gold and Copper Mining Company.—This company is opening its property about 12 miles from Mine Centre and is sinking 2 shafts. It is a Buffalo, N. Y., concern, capitalized at $3,000,000 in $1 shares. The officers are J. I. Stanton, New York, president; Wm. Nicholson, Buffalo, N. Y., vice-president; George A. Sanborn, Kenmore, N. Y., secretary; George E. Eaton, Corning, N. Y., treasurer; F. C. Fisk is manager at Mine Centre.

MEXICO.

DURANGO.

Descubridora Mining and Smelting Company.—This company, at Descubridora, controlled by American capital, has recently awarded contracts through Albert A. Cary, of New York, for the all-electric equipment of its mining and smelting plants. The power outfit of 2 150 h. p. water-tube boilers is to be built by John L. Gill, Jr., of Philadelphia, Pa. The non-condensing compound engines of 200 h. p. capacity, will be manufactured by the American Ball Engine Company and a 125-kw. direct connected 550-volt machine is to be built by the C. & C. Electric Company, of Garwood, N. J.

There are to be 3 hoisting equipments furnished by the Lidgerwood Manufacturing Company of Brooklyn, N. Y. One hoist will have a capacity for raising 4,000 lbs. 300 ft. per minute and will be direct-connected to a 50 h. p. General Electric motor. The other 2 machines will be capable of handling 2,000 lbs. each and are to have 25 h. p. General Electric motors. The pumping equipment consists of an 8 by 8 vertical triplex mining pump, to be made by the Knowles branch of the International Pump Company. It will be driven by a 25 h. p. C. & C. motor.

A large blower to be manufactured by the Connellsville Blower Company to be installed in the smelting works, will be direct connected to a 100 h. p. motor. The lighting plant will consist of a 6-kw. 110-volt generator. The contract called for shipment of all the machinery, etc., by February 1.

SONORA.

(*From Our Special Correspondent.*)

There is a well grounded report that a syndicate of New York men is negotiating for the erection of a 500-ton smelter at Guaymas, and if a favorable concession is obtained, the smelter will be in operation inside of 18 months.

MINING STOCKS.

Complete quotations will be found on pages 199 and 200 of mining stocks listed and dealt in at:

Boston.	Salt Lake City.	Toronto.
Colo. Springs.	Spokane.	Mexico.
New York.	St. Louis.	Paris.
Philadelphia.	London.	
San Francisco.	Montreal.	

NEW YORK. Jan. 30.

A material strengthening of prices in the copper group has improved speculation somewhat, though there is still small profit taking at each upward turn of the market. Wall Street is closely watching the movements of the big operators who were prominent in the recent Amalgamated raid, but are now laying low, apparently awaiting the effect of the reports that the metal prices were advancing and the export demand has increased.

Amalgamated shares have steadily recovered since last week, advancing on large sales to $77⅝ on Wednesday, which is the highest price this year. Moreover, this is a recovery of $17⅛ points from the low-water mark on December 17 last. On the other hand, however, it is still far short of the price at which many made heavy purchases some months ago. Anaconda, a subsidiary concern, has reflected the improvement in Amalgamated, by rising to $34¼ on Wednesday on larger transactions than have recently been recorded. The curb coppers manifest some interest, but trading in them is of small volume. Greene Consolidated of Mexico is reported sold at $28@$30, Tennessee at $14@$14½, British Columbia at $8½@$9¼, and Union, of North Carolina, at $3@$3¼. For White Knob, of Idaho, $17½ was bid, which is $1½ more, it is understood, than was received by the company for a block of 25,000 shares recently sold to a syndicate.

Ontario silver, of Utah, sold off 50c. at $8.

Standard Consolidated, of California, is strong around $3.60, as the February quarterly dividend of 10c. per share has been declared.

Quicksilver shares are steady at $4 for the common and $10½ for the preferred.

Interest in the Cripple Creek, Colo., gold shares is as yet limited, owing to the low market prices, though this ought to be a good time to buy for investment. This district is producing heavily, and has a number of good dividend paying properties. Of the dealings recorded this week we note Elkton sold at $1.25, Anaconda at 26c., and Isabella at 28@32c.

In the Comstock list comparatively few sales are reported to the public, the trading being chiefly among brokers so as to keep the stocks in view. Consolidated California & Virginia brought $1.20, Ophir 83@86c., Mexican 33c. and Hall & Norcross 32c.

Auction sales were 100 preferred shares of Joseph Ladue Gold Mining and Development Company of Yukon, at $1.30 per share, and 350 shares at $1.45; $6,000 6 per cent bonds of New York & Wilkes Barre Coal Company at 55.

BOSTON. Jan. 29.

(From Our Special Correspondent.)

Affairs market-wise have taken on a decided change since the settlement of the copper war. Considerable animation has appeared and prices in most cases are higher than a week ago, although to-night's closings were at concessions from the ruling high prices. Brokers report a revival of interest in copper shares and a disposition to take contracts for the long account. Brokers themselves believe they see stability to the market and are willing to encourage speculation. Amalgamated, of course, has been the leader in activity, following the New York market.

The Franklin Mining Company refused a bid of 12c. for several hundred thousand pounds of the metal to-day and it certainly looks as the corner had been turned in the commodity. A report was current here that the United Metals Selling Company had refused orders for over 20,000,000 lbs. from one consumer but the price was not stated. The mere facts of bids at all is the favorable feature in the situation and the amount mentioned cannot but lend confidence. The reduction in the Quincy dividend was not surprising and yet in the face of it the stock recorded an advance. This company distributed $10 from last year's earnings. The production was about 20,000,000 lbs. at an estimated cost of 9c. per lb., including construction. Considerable of a stir is being made in Old Dominion mining affairs, and it is being made a speculative foot-ball in the market. The stock was dropped to 21¼ Tuesday on a false rumor that the mine had been closed down. It seems that the mine is running and making the customary output. It recovered to $23 to-day. A longstanding pool in this stock is what is causing the most trouble and certain people have been trying hard to disrupt it. The firm of which the late L. B. Schofield was senior partner, and who shot himself to-day, has been quite a factor.

Osceola has shown quite a rallying power, having advanced $5½ to $85½ in the week, with a $2 reaction. Copper Range moved up over 6½ points to 60½, closing at $58 to-night, and Baltic $5 to $40, closing at $39. It is thought that the Copper Range outfit would be a favorite in any prolonged movement in market prices. Trimountain rose $4½ to $61½, but the market is very superficial. It closed at $59. Utah also shows strength, touching $25 to-day on the bulge. Adventure, Centennial, Mohawk, Massachusetts and Michigan continue favorites when the spell is on. Even Arcadian bulged to $6¼ Tuesday on manipulation, but it subsided to $5 to-day. United States has moved up $2 to $16, and the buying was reported of a strong character. Poor Cochiti touched 75 to-day and it apparently has no friends now. The reported saying by Mr. Stanton that no dividend would be paid by Atlantic causes hardly any surprise. The stock is steady at $25½, being $2½ above a week ago. The annual export of the Victoria Copper Company shows $93,965 cash on hand. This is not a producer, and is one of the 1898-'99 flotations. Consolidated Mercur is again favored with a 12½c. quarterly dividend and the fact that Mr. Do La Mar has sold his holidays to a syndicate removes a disturbing factor from the situation.

SALT LAKE. Jan. 25.

(From Our Special Correspondent.)

Sales of stocks on the Exchange were freakish all the week. Dividend-paying stocks suffered as much as others. Consolidated Mercur was held around $1.50; Daly-West, another dividend payer, has fallen slightly; Yankee Consolidated, selling about 60 days ago around $5, sold for $1.91, although monthly dividends of 5c. per share are promised. With such stocks falling others less prominent have lost value. A few investors seem to be loading up with the best stocks at the low prices. The total number of shares sold on the stock exchange and open board amounted to 514,245 shares, valued at $217,149 for the week ending January 25.

The annual meeting of the shareholders of the Silver King Mining Company was held at Park City, January 21. The organization of the board remains the same—David Keith, president; Thomas Kearns, vice president and general manager; W. S. McCornick, treasurer; W. G. Lamb, secretary. The dividends are not to be increased.

The Lower Mammoth Mining Company, of Tintic, on January 21 at the Salt Lake City office elected the following officers: Simon Bamberger, president and general manager; J. D. Wood, vice president; Joshua Barnett, treasurer, and J. B. Bean, secretary.

Consolidated Mercur quarterly dividend of 12½c. per share was posted January 24, or $125,000. Of this amount Capt. J. R. De La Mar takes down on February 6 $75,000 as his share. It is rumored that the captain may part with his holdings, and it is upon this errand that John Dern, the vice president, left for New York on January 18.

SAN FRANCISCO. Jan. 25.

(From Our Special Correspondent.)

The stock market has been depressed with lower prices generally. A good deal of trading was done in the fall, and towards the close the market was much steadier.

Consolidated California & Virginia sold down to $1.25@$1.30. Ophir sold at 81@85c.; Hale & Norcross, 35@36c.; Mexican, 28&30c.; Potosi, 14c.; Best & Belcher, 12@14c.; Chollar, 12c.; Crown Point, 7c.

On the Producers' Oil Exchange business was fair only, with moderate buying: Home Oil sold at $3.65; Monte Cristo, $1.45; Reed Crude, 39c.; Oil City, 21c. The larger part of the trading was in the low priced stocks.

LONDON. Jan. 23.

(From Our Special Correspondent.)

A new company, called the Spanish Tin Mining Corporation, Limited, has been advertised this week. This company has been formed to acquire properties in Aruoya District of the Province of Orense, Spain. Accordng to Mr. James Mactear, who reported on the properties there, is an alluvial deposit of over 3,000,000 cubic yards, averaging 11 lbs. per ton of tin oxide that can be recovered by ordinary hydraulicking. There are also tin veins in the mountains above which may be worked subsequently. M. Louis Pelatan also reports on the properties, and agrees substantially with M. Mactear. The capital is £350,000, of which £300,000 in shares goes to the vendors and £50,000 will provide working capital. The proposition as described by the mining engineers seems an attractive one, but owing to the fact that the promotion is in the hands of people belonging to the Hooley group the shares are not in favor and the public is not responding to the offer of shares. The company operations by this group are not liked, and the recent scandal in connection with the Siberia Gold-Field Company are within the knowledge of investors. There are also details in the method of flotation which are not conducive to confidence, and the chances are that the company will not be a success.

PARIS. Jan. 19.

(From Our Special Correspondent.)

The mining stock section of the Bourse remains quiet generally, the only exception being in the South African gold shares, in which business has been once more active. The reason for this seems to be rather in the London revival than in any real anticipation here of immediate activity at the mines. So far as one can see the military situation has not changed, and the actual gold production is still insignificant. There is a general anxiety among holders of these shares to see some revival and they are ready to help any movement.

Copper shares are weak, as might be expected from the serious fall in the metal. One hardly knows what to make of the present situation, but we believe that it will work itself out on your side of the water and that we cannot greatly affect the result.

The lead and zinc stocks are generally weak on account of the depression in those metals, which has brought about the present low prices. Le Nickel, on the other hand, is strong, the probable increased use of that metal and the rumors of a combination of producers having aided the stock.

The movement of gold and silver in France for the 11 months ending November 30 is reported by the Minister of Commerce as below:

	Imports.	Exports.	Excess.
Gold:			
1901	Fr. 353,957,000	Fr. 134,776,000	Imp. Fr. 219,181,000
1900	396,619,000	103,906,000	Imp. 292,713,000
Silver:			
1901	89,541,000	133,103,000	Exp. 43,562,000
1900	133,231,000	186,266,000	Exp. 53,035,000

Imports of copper and nickel coins, taken at their face or coinage value, were 103,000 fr., against 55,000 fr. in 1900. Exports of these coins were 304,000 fr. last year, against 305,000 fr. in 1900.

Monsieur Thery in a recent paper takes 150 of the stocks most largely dealt in on the Paris Bourse, and finds that the loss on these has been comparatively small during 1901. The total of the par value of these stocks in January, 1900, was 58,214,000,000 fr. At the end of June there was a total depreciation of 1,319,000,000 fr. on the selling value as based on quotations; but during the second half of the year there was a recovery of 299,000,000 fr., which reduced the

DIVIDENDS.

Name of Company.	—Latest Dividend— Per Date.	Per Share.	Total.	Total to Date.
†Allis Chalmers, pf.	Feb. 1	1.75	284,375	853,125
Armstad y Concordia	Jan. 10	2.00	20,064	36,064
Bunker Hill & Sull.	Feb. 4	.07	21,000	1,327,000
Cambria Steel, Pa.	Feb. 15	.75	750,000	4,500,000
§Colo. Fuel & I., pf.	Feb. 20	4.00	80,000	1,400,000
†Con. Mercur, Utah.	Feb. 7	.12½	125,000	610,000
Consolidation Coal.	Feb. 1	2.00	205,000	5,523,000
*Jeff & Clearf. C.& I., pf.	Feb. 15	2.50	37,500	487,500
New Zealand, Colo.	Jan. 25	.01	7,650	114,300
Penoles	Jan. 31	22.15	55,375	1,405,925
Providencia, S. J.	Jan. 13	.87	5,220	105,360
*Quincy, Mich.	Feb. 15	4.00	400,000	13,270,000
San Carlos Minillas	Jan. 31	4.43	11,075	223,254
Sta. Gertrudes	Jan. 10	.04	1,152	2,551,352
Sta. Mariade Guad.	Feb. 10	4.43	11,075	303,675
†Standard, Con., Cal.	Feb. 10	.10	17,839	4,053,297
†Tenn. C. I. & R. R., pf.	Feb. 1	2.00	4,000	267,840
Union, Colo.	Jan. 29	.02	25,000	445,244
†U. S. Steel, com.	Mar. 21	1.00	5,084,350	15,227,812
†U. S. Steel, pf.	Feb. 13	1.75	8,927,933	26,752,894

*Monthly. †Quarterly. §Semi-annual.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
Admiral	Utah	1	Dec. 23	Feb. 1	.00½
Alaska	Utah	..	Feb. 7	Feb. 27	.02
Alpha Con.	Nev.	..	Jan. 27	Feb. 20	.03
Andes	Nev.	..	Feb. 10	Mar. 18	.05
Annandale	Utah	..	Feb. 15	Mar. 12	.00½
App. Con.	Cal.	1	Feb. 6	Mar. 5	1.00
Best & Belcher	Nev.	..	Feb. 3	Feb. 28	.15
Boss Tweed	Utah	4	Feb. 7	Feb. 24	.01
Century	Utah	..	Feb. 11	.... ..	.10
Challenge Con.	Nev.	..	Feb. 9	Mar. 5	.05
Chollar	Nev.	..	Jan. 17	Feb. 12	.05
Christmas	Utah	9	Jan. 2	Feb. 1	.00½
Comstock	Utah	..	Jan. 20	Feb. 8	.10
Copper Queen	Utah	..	Jan. 14	Feb. 4	.00½
Dimond Creek	Cal.	..	Feb. 28	.... ..	.01
Dudley	Cal.	13	Jan. 13	Feb. 4	.02
East Honerine	Utah	1	Feb. 12	Feb. 28	.00½
Emerald	Utah	..	Feb. 15	Mar. 12	.00½
Eutonia	Utah	9	Jan. 20	Feb. 7	.00½
Garibaldi	Cal.	1	Jan. 21	Feb. 15	.01½
Gould & Curry	Nev.	..	Feb. 2	Feb. 24	.10
Inyo Marble	Cal.	35	Jan. 15	Feb. 10	.05
Jefferson	Utah	4	Jan. 13	Feb. 1	.03½
Julia Con.	Nev.	..	Jan. 17	Feb. 12	.03
Maple	Utah	4	Jan. 15	Feb. 5	.00½
Martha Washington	Utah	8	Jan. 25	Feb. 17	.01
Minnie	Utah	4	Feb. 22	Mar. 25	.00½
Mohican	Cal.	2	Jan. 4	Feb. 3	.05
Orient	Utah	2	Feb. 15	Mar. 15	.00½
Reward	Cal.	..	Feb. 8	.... ..	.03
R. G. W.	Utah	..	Feb. 24	Mar. 15	.00½
Sailor Con.	Cal.	14	Jan. 17	Feb. 7	.01
Savage	Nev.	..	Feb. 2	Feb. 27	.05
Shower Con.	Utah	6	Feb. 3	Feb. 24	.02
Silver State	Utah	..	Jan. 17	Feb. 6	.01
Skylark	Utah	4	Feb. 10	Feb. 26	.00½
Tintic Copper King	Utah	..	Feb. 5	Mar. 5	.00½
Twentieth Century	Utah	2	Jan. 17	Feb. 10	.001
Union Con.	Nev.	..	Jan. 31	Feb. 24	.10
Wandering Jew	Utah	7	Jan. 24	Feb. 11	.001
West Morning Glory	Utah	19	Feb. 19	Mar. 8	.01
Yellow Jacket	Nev.	..	Feb. 8	Mar. 18	.10
Yuba Con.	Cal.	5	Jan. 27	Feb. 17	.03

loss for the year to 1,020,000,000 fr. The larger part of this loss, however, was in the industrial and mining stocks.

Our economists are very much disturbed at the census returns which are now coming in in completed form and which show that the population of France has been declining slightly, the birth rate for several years past having been somewhat below the death rate. All sorts of remedies are suggested for this state of affairs, but our wise men do not seem by any means to be agreed. A reduction of taxes to be progressive according to the size of the family is an old remedy which was suggested years ago. I believe Monsieur Leroy-Beaulieu originated this idea, but it is not important. I am afraid that unless some more efficient remedy can be found we will have to be satisfied with the position of a stationary nation, which is not by any means flattering to our national pride. AZOTE.

COAL TRADE REVIEW.

NEW YORK. Jan. 31.

ANTHRACITE.

The anthracite trade shows continued activity. Milder weather has been followed by storms and any weakness in the market has had little chance to develop. The production continues heavy and is practically all taken, only certain sizes, such as egg, accumulating to any extent with producers. The total production for December is officially given as 3,623,423 tons, making a total for the year of 5,349,673 tons. The mines are generally very busy and the largest producer is running many of its collieries full time. The only cloud in sight that may threaten a continuance of present activity is the possibility of labor trouble. The United Mine Workers at their convention in Indianapolis have agreed to demand that the operators meet the miners in convention, thus giving a recognition of the union; and to use the whole power of the union to secure these demands. An 8-hour day and a minimum rate for labor are wanted. If this demand is in good faith there is trouble ahead. It is safe to say that the operators will not readily consent to the requests, but will make vigorous objection. Some men in the trade are disposed to resent the action of a certain United States Senator who apparently for political ends is willing to pose as a champion of labor and the harmonizer of all differences between employers and employes. The United Mine Workers have not forgotten his good offices in settling the strike in 1900, and are apparently willing to call upon him again in case of further trouble, while he himself is evidently disposed to make the best of any such opportunity. It is of course impossible as yet to say what will be the outcome of the convention's action, but the possibility of a general strike at the mines by April 1 will doubtless help keep the market strong for the balance of the winter.

Trade in the Northwest is good, and shipments from the docks are heavy. The indications are now that there will be anthracite still in stock at the head of the Lakes by the opening of navigation, though some sizes will be cleaned up. In Chicago territory chestnut size is getting scarcer and scarcer and prompt receipts at points receiving all-rail coal are said to command a premium. The other sizes are in good supply and there is no lack of coal for points supplied from the docks. Along the lower lakes and in Canadian territory snow storms have hindered receipts and chestnut coal is very scarce. The demand from Canadian points is especially strong. In the all-rail trade farther east buying remains active while poor car supply and delays by storms restrict receipts. Along the Atlantic seaboard demands at the end of the week following the colder weather have improved materially. Prices continue steady while the steam sizes are still in short supply with premiums paid for prompt delivery. The demand for steam coal has doubtless been instrumental in bringing about a temporary scarcity of broken at New York Harbor points.

Last week some of the collieries in the Lehigh region had further trouble from floods. The Reading, though it has 32 collieries busy in the Schuylkill region, is not shipping anything like its full tonnage.

Prices show no change and we continue to quote for free burning white ash coal f. o. b. New York Harbor points, broken, $4; egg, $4.25; stove and nut, $4.50; pea coal is nominally $3, and buckwheat $2.50.

BITUMINOUS.

In the seabord bituminous trade there has been but little improvement in market conditions during the week, and producers are still utterly unable to meet all the demands of their regular customers. The demand usually falls off at about this time, hence it is probable that the worst of the urgency is past and that consumers will be able before long to supply their customers promptly. Car supply on the railroads, however, continue poor in spite of promises and is not likely apparently, to show much gain for some time, though it will be less a factor with the lessening demand for fuel. There is nothing in the resolutions passed by the Mine Workers' convention to foreshadow any serious labor disturbances, and it is hardly probable that mining rates in the bituminous districts this year will be the same as last.

Some contracts for the coming year's business are being closed generally on a provisional basis, or on the Association figures for coal at the mines. The railroads have not yet announced what action they will take on freights and through charges and in the absence of such statements contracts are closed slowly.

Trade in the Far East is calling for a liberal tonnage and is receiving good shipments. Along the Sound some consumers are still in want for coal, and the demand is strong, the situation improving but slowly. At New York harbor points coal is in short supply and industrial concerns are taking almost any kind of fuel they can use. The better grades of bituminous are still practically out of the market, producers being unable to do anything more than try to keep their regular customers going. In the all-rail trade producers continue to cut down orders received and the trade could easily take a much larger tonnage than is allowed it.

Transportation from the mines to tide water is irregular and rather slow. Car supply shows little or no improvement and is not much above 50 per cent of the demand. In the coast-wise vessel market vessels are in fair supply while rates are firm. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, $1; Boston, Salem and Portland, $1.15; Portsmouth, $1.20. Rates from the further lower ports are about 5c. above these figures.

As noted above the better grades of bituminous while nominally selling at regular list figures, are practically out of the market so far as transient buyers are concerned. Classified, often of poor quality, sells at $2.60 and $2.85 f. o. b. New York harbor shipping ports.

BIRMINGHAM. Jan. 27.

(From Our Special Correspondent.)

Alabama coal production is large. The demand is greater than the production and good prices obtain. There is no labor trouble in mining circles and the maximum wages are being paid by the operators. During the past week in the offices of the State Mine Inspector an examination was held for first and second class mine foremen's certificates. Thirty men stood the examination.

J. Moody, of Indiana, a well known coal operator, has taken charge of the Sloss Company's mines at America, in Walker County, this State. There will be several new mines opened on the Ensley Southern Railroad now being completed between Ensley, in Jefferson County, and Parrish, in Walker County. One mine with a small capacity on the western end of this road has already been opened and is in operation. Several others will be opened within the next few weeks.

CLEVELAND. Jan. 29.

(From Our Special Correspondent.)

The coal market during the last week or ten days has showed frequent fluctuations, prices varying with every change of temperature. The warm waves have resulted in some of the dealers being able to collect supplies which were in excess of the actual needs of the market, and this has been followed by efforts to unload, resulting in some depression of prices. The fluctuations, however, have not been very marked but have resulted in general instability in the market. The result, however, has been the sale of large amounts of fuel. The domestic trade has been the principal feature of the market. The movement upon the railroads has been free and uninterrupted due to the better supply of motive power and the relief, to a certain extent, of the tracks from the burden of general merchandise.

The coke supply has been much relieved lately. The railroads running into the coking regions have been better equipped for handling the required amounts with the result that all of the blast furnaces depending upon the supply of coke for continuing operation, have been able to resume operations. Nothing has been done as yet looking toward the establishment of the prices of coal to be delivered in the Northwest during the coming season but it is expected that a meeting of coal operators will be held the latter part of February or the first of March.

PITTSBURG. Jan. 29.

(From Our Special Correspondent.)

Coal.—The coal trade has never been better than at the present time and all the mines in the Pittsburg District are in full operation, the railroads taking care of the product satisfactorily. The recent rain and snow have raised the rivers to a boating stage and probably 2,000,000 bushels of coal will be sent to Southern ports this week. There is considerable interest over the convention of the United Mine Workers in Indianapolis. The reports show that the sentiment of the delegates is strongly in favor of an advance both in pick and machine mining and also for the run-of-mine system, all of which the operators positively say they will not concede. They do not look for a strike to enforce demands for an advance or a single standard and seem confident that the miners will conclude to accept the present wage scale and conditions for another year.

The Pittsburg & Buffalo Company, in addition to its coal mining and brick manufacturing interests, will soon become an important competitor of the sewer pipe combination. It has put a plant in operation this week at Johnetta on the Alleghany Valley Railroad with one 36-in. press and another will be ready within 30 days. The agents of this company are now locating two plants, one at Rochester, Pa., and the other at Akron, O. Each will be equipped with two 36-in. presses and will be put in operation in about four months. When the three plants are running the company will have a capacity of from 25,000 to 30,000 ft. of sewer pipe a day.

Connellsville Coke.—The railroads have better control of the coke trade and promise still further improvement. It is not likely that there will be any complaint regarding transportation facilities in the coke region for some time. Prices continue firm with furnace coke at $2.25 and foundry at $2.75@$3 a ton. The piles of coke that were stacked in the yards are gradually being removed and conditions at the ovens will soon be as they were previous to the freight congestion. The last issue of the Connellsville *Courier* gives the production for the week at 207,420 tons. The shipments for the week aggregated 11,277 cars distributed as follows: To Pittsburg and river tipples, 3,440 cars; to points west of Pittsburg, 5,652 cars; to points east of Connellsville, 2,185 cars. This was an increase of 96 cars compared with the shipments of the previous week.

FOREIGN COAL TRADE. Jan. 30.

Export trade continues quiet, as for several weeks past, and no new contracts of importance are to be noted. Ocean freight rates continue about the same.

Exports of coal from the United States for the year ending December 31 are reported by the Bureau of Statistics as follows, in tons:

	1900.	1901.	Changes.
Anthracite	1,654,610	1,993,307	I. 338,697
Bituminous	6,262,909	5,390,086	D. 872,823
Total coal	7,917,519	7,383,393	D. 534,126
Coke	376,999	384,330	I. 7,331

The coke exported went chiefly to Mexico and Canada. The coal exports were distributed as follows:

	1900.	1901.	Changes.
British N. America	5,422,493	5,080,963	D. 341,530
Mexico	664,036	551,448	D. 112,588
Central America	9,669	14,016	I. 4,347
South America	214,126	277,800	I. 63,674
West Indies	761,079	735,389	D. 25,690
Hawaii	21,001	.....	D. 21,091
Philippines	75,869	71,718	D. 4,151
United Kingdom	4,412	569	D. 3,843
Germany	10,756	48,601	I. 37,845
France	169,800	224,876	I. 55,076
Other Europe	450,269	315,530	D. 134,739
Miscellaneous	114,009	62,483	D. 51,526
Totals	7,917,519	7,383,393	D. 534,126

Shipments to Hawaii are no longer counted as exports. The same is the case with shipments to Porto Rico, which in 1900 were included in the exports to the West Indies, and were 15,313 tons. The changes in exports are fully shown in the table.

Receipts of coal at Hamburg, Germany, for the past year are reported by H. W. Heidman as below, in metric tons:

	1900.	1901.	Changes.
Great Britain	3,014,923	2,691,790	D. 323,133
United States	4,499	14,076	I. 9,577
Total imports	3,019,422	2,705,866	D. 313,556
German coal	1,602,521	1,733,283	I. 130,762
Totals	4,621,943	4,439,149	D. 182,794

The increase in American coal was chiefly in anthracite imported during the last quarter of the year.

United States Consul Berliner writes from Teneriffe, Canary Islands, that the contract price for coal there for the year 1902 is 25s., or $6, per ton, f. o. b., put in bunkers and trimmed. Vessels having no contracts have to pay 27s., or $6.50 per ton.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of January 18th, that the general tone of the Welsh coal market remains dull and prices, both for Cardiff and Monmouthshire descriptions, are about unaltered. Quotations are: Best Welsh steam coal, $3.84@$3.96; seconds, $3.72; thirds, $3.60; dry coals, $3.72; best Monmouthshire, $3.66@$3.72; seconds, $3.48; best small steam coal, $2.40; seconds, $2.28; other sorts, $2.04.

The above prices for Cardiff coals are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2 1-2 per cent discount.

The freight market has again been active and a fair amount of chartering has been done. Rates of freight keep very easy. Some rates noted are, from Cardiff: Algiers, $1.30; Marseilles, $1.35; Genoa, $1.32; Naples, $1.32; Port Said, $1.26; Singapore, $2.82; Las Palmas, $1.38; St. Vincent, $1.56; Rio Janeiro, $2.58; Santos, $2.88; Buenos Aires, $2.34.

IRON MARKET REVIEW.

NEW YORK, Jan. 30.

The iron trade continues extremely active and buying of pig iron is still on a large scale. Some German billets are again reported sold here, and there has also been a contract placed with the Dominion Iron and Steel Company for some 12,000 tons of billets, the first to be produced from the new steel works.

The Lake Superior iron ore people have agreed upon $4.25 a ton at Lake Erie ports as a basis for prices of bessemer ores for next season. No agreement has been made on non-bessemer ores, but it is thought the range will be not far from $3.

The event of the week has been the publication of the report of the United States Steel Corporation, which is a very full statement of the company's business operations. It is given on another page.

The statement of the American Iron and Steel Association, giving pig iron production for 1901, will also be found on another page.

BIRMINGHAM. Jan. 27.

(*From Our Special Correspondent.*)

The pig iron market in this State is firm. The demand is equal to the production and there is no accumulation of iron. Orders are being accepted in the district on which delivery will be made several months to come and in a few instances as late as next December. The reports in the office of the Southern Iron Committee, where record is made of the way bills filed for future shipments, so as to protect on freight rates in effect at time of sale, are very encouraging. The railroads are still a little slow in furnishing cars, but there is not so much delay as there has been. The local consumption is keeping up well. The following quotations are given: No. 1 foundry, $12.50; No. 2 foundry, $12; No. 3 foundry, $11@$11.50; No. 4 foundry, $10.50@$11; Grey Forge, $10.50; No. 1 soft, $12.50; No. 2 soft, $12.

At the rolling mills, in Birmingham, Bessemer, Gate City, and elsewhere there is steady work being done and the output is good. The little mills at Sheffield have commenced operation again and shortly will be busy in all departments. Foundrymen report good conditions in their line while machine shops are busy on local and foreign work. There is no labor trouble in the iron or kindred trade circles in this district.

BUFFALO. Jan. 29.

(*Special Report of Rogers, Brown & Co.*)

Scarcely a day passes that does not accentuate the absolute rigidity of the market situation. There is now no possibility of being able to select favorite brands of iron, either coke or charcoal. Diligent searching fails to secure the small lots of special brands or grades needed to balance mixtures. Inquiries are many and urgent. This condition at present applies only to shipments prior to July 1, though iron is estimated in short supply for delivery the third quarter. We quote below on the cash basis f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, $17.75; No. 2, $17.25; Southern soft No. 1, $17; No. 2, $16.50; Lake Superior charcoal, $19.50.

CLEVELAND. Jan. 29.

(*From Our Special Correspondent.*)

Iron Ore.—The Ore Association has agreed upon a new list of prices for the ensuing year. The market was opened on Monday with the old base price, of $4.25 on bessemer old range ore, prevailing. Some sales have already been made and it is expected that the entire output for the ensuing year will have been sold within two weeks. While no agreement was reached as to the price of non-bessemer old range and the Mesabi ores there is an understanding and the prices range about as follows: Non-bessemer old range, $3.25; Bessemer Mesabi, $3.35 to $3.50; non-bessemer Mesabi, $2.85 to $3. The ore men did not consider that the time is ripe for an agreement as to the price and output of other than the old range bessemer ore. Nothing has been done as yet as to fixing the rates at which ore is to be carried down the lakes this year but it is expected that chartering will begin in about two weeks. The estimates, presented at the meeting of the Ore Association, which was held the latter part of the week, indicate that the production of Bessemer ore during the year will be about 3,500,000 tons while the total output of the Lake Superior district will be about 23,000,000 tons.

Pig Iron.—Some consumers of foundry iron are finding that the material upon which they have to rely for their supply during the second quarter of the year is not plentiful. Many of the furnaces are entirely sold up and some of their best customers have made no provision whatever for their needs after March. Adding to this, some of the smaller furnaces never lay in an advanced supply and will suffer. Prices hold at $16.50 for No. 1 and $16 for No. 2 Valley furnace. Bessemer iron is very scarce with few sales being made. Prices, however, hold at $15.75 in the Valley. Basic producers have made no sales of iron for delivery during the second quarter but are asking $15.75 and will probably get it. Some contracts will be closed in the next few days.

Finished Material.—All of the prospects now are that the price of bars will be advanced shortly, probably $2 on the ton. The mills are well sold up ahead and are comfortably filled with orders so that they are now in position to advance the price to ward off a little of the business until a later date. The endeavor will be to preserve some business to be done in the future. At present, however, prices remain at 1.50c., Pittsburg, on bar iron and bessemer steel bars and 1.60c., Pittsburg for open-hearth steel bars. Structural steel is probably the leader in sales. The mills are in fact embarrassed with the orders that are coming in. No mill is now able to offer deliveries inside of three or four months; this, too, at a time when the spring trade is about to open. The prices hold firm at 1.60c. Some billet inquiries have been heard of late, but the market shows no material available for sales now. The indication, however, is somewhat distressing as the German supply is falling short due to the fact that business conditions there are improving. Sheets are also in big demand and the store sales have been extraordinarily heavy, but with no change in price, the quotations on No. 27 being 3.35@3.50c. Steel rails are in slight demand only, but the mills are far out of reach of a possible need for orders. The old price of $28 is being quoted.

Old Iron.—The scrap trade this week shows an upward tendency. It would be extremely difficult to quote prices which would represent the market. The dealers are being compelled to pay better prices than heretofore, and are therefore trying to market their product at a better figure. Consumers, however, are refusing to pay any better price and the two elements of the market are at a deadlock. Little business is being done.

PHILADELPHIA. Jan. 30.

(*From Our Special Correspondent.*)

Pig Iron.—The current pig iron quotations will do as well as any others for the present. The sales made since last week for so-termed early delivery were made at 25 to 50c. per ton over the average public quotations, but this business was largely in foundry iron. Foundry interests are pretty well supplied and much of the business referred to was for mixing purposes. Forge users have not bought during the past week. Some basic pig has been arranged for and already a few car-loads are standing in the West Philadelphia yards.

Sheets.—The sheet iron people continue to be worern territory continues and arrivals indicate that consumers are busy. Prices were reported to-day at $29 at mill.

Bars.—Prices on actual sales have advanced and where any deliveries are possible, each sale sets on its own basis. Our manufacturers continue averse to booking heavily for remote delivery, except at top prices. The mills are doing their best and the car shops are on the warpath for common iron. Steel bars are not to be had for early delivery.

Sheets.—The sheet iron people continue to be worried about raw material and conditions may yet force them to provide an independent source of supply. The store keepers, city and country, are working off large lots; corrugated and roofing material are now coming in for attention.

Plates.—There is something in progress among plate iron and steel people looking so outsiders aver, to an arrangement or combination that will secure this branch of industry against fluctuating prices. A fair volume of new business is being done at usual quotations.

Structural Material.—It is safe to say that higher prices could be sustained were they made. The policy of the managers is against any further change in view of oversold conditions. Constructing engineers and certain railroad interests are trying to arrange for way to August deliveries and are not yet fixed up. The inquiries from foreign sources are giving the managers something to think about as the requirements call for June delivery.

Rails.—Notwithstanding the secrecy surrounding the steel rail transactions it is known there has been quite a rush of orders for mid and late summer deliveries.

Scrap.—There is a movement among some mills using scrap to obtain the particular kinds they want. Scrap dealers say there will be advances of perhaps 50c. on choice railroad and heavy steel.

PITTSBURG. Jan. 29.

(*From Our Special Correspondent.*)

The iron and steel markets continue to grow stronger daily, and there is assurance now that prices of raw and finished material will be no lower than at present during the entire year. Steady advances in most lines likely will occur as the demand warrants, but the controlling interests will prevent abnormal prices and thus insure the most successful year in the history of the iron and steel industry. During the week the Republic Iron and Steel Company withdrew from the bar iron market, being practically sold up to July 1. The American Steel Hoop Company had advanced the price of bars $2 a ton, making the rate 1.60c. The former price was 1.50c., Pittsburg, and 1.55c. at eastern mills. An agreement on prices was reached by the leading interests and the rate now in effect is 1.60c. Pittsburg, freight being added to outside points. A meeting of the steel bar interests was held here yesterday to consider trade conditions and discuss prices. Both steel and iron bars have been selling at the same rate and it was for the purpose of considering the advisability of meeting the advance made on iron bars that the conference was called. Representatives of concerns making both steel and iron bars urged an advance, but were overruled as the present price of 1.50c. was continued. The principle concerns represented at the meeting were the United States Steel Corporation, Jones & Laughlins, Limited, the Republic Iron and Steel Company and the Cambria Steel Company. It was developed that the steel bar trade is in almost as good shape as iron bars. Many mills have specifications that will keep them busy for over two months and some have orders booked for several months ahead.

There is but little bessemer pig iron to be had for delivery during the first half, and for early shipment $17 at the furnaces can readily be obtained. Sales have been made into the fourth quarter. There is no foundry iron for early delivery, the furnaces being practically sold up to July 1 and many inquiries are being received for second half delivery.

Prices quoted are a shade higher than Southern foundry iron offered, but the product of the Valley furnaces is preferred by the consumers of this district. Gray forge continues in good demand, but it is getting scarce and prices are firmer this week. Sheet bars are easier and some sales have been made at $32 @$33. The sheet market is becoming stronger, but prices remain unchanged. Arrangements are being made for a meeting in this city on Monday, February 3, of independent sheet steel manufacturers. The object is to form an association that will be of mutual benefit to the members.

Pig Iron.—The sales of bessemer pig iron during the week amounted to from 3,000 to 4,000 tons. The price ranges from $16 to $17, Valley furnaces, according to time of delivery, the latter figure being for prompt shipment. Some sales have been made for delivery in the second half at $16 and the minimum price for delivery this quarter is $16.50, Valley. Foundry No. 2 is practically sold up for the first half and for early shipment $17 to $17.25 is asked. For the second half $16.75, Pittsburg, is quoted, while the Southern product can be had at $16.15. Gray forge is still in good demand and several thousand tons were sold this week at $16.50, Pittsburg. For the third quarter $16.25 is quoted.

Steel.—The steel market continues strong and prices firm. Bessemer steel billets are scarce and but few sales were made. The price has advanced to $28.50@$29. Steel bars continue to be quoted at 1.50c. and tank plate at 1.60c. Sheet bars are easier and some sales are noted at $32 and $33.

Sheets.—The sheet steel market shows a decided improvement, but prices remain unchanged. No. 28 gauge is quoted at 3.10@3.20c. by the American Sheet Steel Company and galvanized sheets at 70 and 10 and 70 and 5 per cent off.

Ferror-manganese.—The demand continues fairly good for 80 per cent domestic and the price remains at $52.50.

IRON MARKET.

NEW YORK, Jan. 31.

Pig Iron.—Demand is active and the local market continues strong. We quote for tidewater delivery: No. 1X foundry, $17@$17.65; No. 2X, $16.35@$17; No. 2 plain, $16@$16.25; gray forge, $15.35@$15.65. For Southern iron on dock, New York, No. 1 foundry, $16.25@$16.50; No. 2, $15.75@$16; No. 3, $15.25@$15.50; No. 4, $14.75@$15; No. 1 soft, $16.50; No. 2, $15.75@$16.

Bar Iron and Steel.—Demand continues good. We quote 1.58c. for common bars in large lots on dock, refined bars, 1.63@1.68c.; soft steel bars, 1.68c.

Plates.—Buying, though mostly for small lots, continues steady. Eastern mills quote for tidewater delivery in car-loads: Tank, ¼-in. and heavier, 1.78c.; flange, 1.88c.; marine, 1.98c.; universal, 1.78c.

Steel Rails and Rail Fastenings.—There is little doing in the market. Standard sections are still quoted at $28 at Eastern mills; light rails at $28@$30, according to weight. Spikes are 1.80c.; splice bars, 1.55c.; bolts, 2.60@2.70c.

Structural Material.—Building operations at this point continue active and the market for structural material should be good throughout the year. We quote for large lots at tidewater as follows: Beams, 1.75c.; tees, 1.80c.; angles, 1.75c.

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 202.)

New York. Jan. 31.

The feature is nitrate of soda, which continues to advance owing to the labor troubles in Chile, and subsequent control of shipments by strong interests. Brimstone is likewise firm and high, interfering with the booking of any large contracts. In manufactured products deliveries are chiefly on contracts booked some time ago. Some new orders for future shipment have been taken, but the bulk of this business has already passed.

Heavy Chemicals.—Domestic high-test alkali sold over next fire at 80@85c. per 100 lbs., f. o. b. works, while prompt business is doing at 5c. higher. Foreign alkali is featureless at 90@92½c. per 100 lbs. in New York. American high-test caustic soda is in good request for immediate delivery, and sales are noted at $1.85 per 100 lbs. f. o. b. works; contracts forward are reported at 5c. less. Bicarb. soda finds ready sale at $1@$1.05 per 100 lbs., for ordinary, f. o. b. works, and $3 up per 100 lbs. for best grades. Sal soda is moving quietly at 55c. per 100 lbs., f. o. b. works, while foreign is obtainable at 67½@70c. per 100 lbs. in New York. Bleaching powder is unchanged; prime Liverpool holds at $1.75@$1.87½ per 100 lbs., and Continental, at $1.62½@$1.75, while domestic is nominal at $1.37½@$1.62½, according to test. Chlorate of potash is quiet at $7½@$7¾ per 100 lbs., f. o. b. works, on contract, and $8@$8⅛ for immediate shipment.

Arsenic.—The curtailment of production in Great Britain is reflected here in firmer prices. White arsenic on spot is held at $3¾ per 100 lbs. for prime English, and $3⅜ for German, while 50 tons of Canadian for April shipment were reported sold recently at $3¼. Red arsenic is quoted at $6¾@$7¼ per 100 lbs., according to quantity and quality.

Acids.—Contracts absorb most attention. Prices are firm.

Blue vitriol is slightly stronger, as the export trade will soon commence.

Exports of copper sulphate from New York in the year 1901 were 37,562,385 lbs., valued at $1,767,087. Of this total 36,476,000 lbs. went to Europe, chiefly to Italy. We also sent 164,943 lbs. to Africa, and a small lot to Australia. Our best customer in South America is Argentina, which received 476,865 lbs. A moderate business was done with Canada. Mexico imported 309,727 lbs.

Quotations are per 100 lbs. as below, unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity.

Acetic, com'l 28%.....	$1.80	Oxalic, com'l...	4.15 @5.12½
Blue vitriol.....	4.25@ 4.50	Sulphuric, 50 deg., bulk ton	14.00@16.00
Muriatic, 18 deg.....	1.50	Sulphuric, 60 deg.....	1.00
Muriatic, 20 deg.....	1.62½	Sulphuric, 60 deg., bulk	18.00@20.00
Muriatic, 22 deg.....	1.75	Sulphuric, 66 deg.....	1.20
Nitric, 36 deg	4.00	Sulphuric, 66 deg., bulk	21.00@23.00
Nitric, 38 deg.....	4.25		
Nitric, 40 deg.....	4.50		
Nitric, 42 deg.....	4.87½		

Brimstone.—Strong. Best unmixed seconds on spot hold at $24 per ton, and shipments at $23.25@$23.50. Best thirds are worth $2½ per ton less than seconds. At these high prices consumers are slow in contracting.

Pyrites.—While brimstone remains at present high prices, the market for pyrites is expanding. This week 3,085 tons Spanish iron pyrites came to New York.

Quotations are f. o. b.: Mineral City, Va., lump ore, $5 per ton, and fines, 10c. per unit; Charlemont, Mass., lump, $5, and fines, $4.75. Spanish pyrites, 12@14c. per unit, delivered ex-ship New York and other Atlantic ports. Spanish pyrites contain from 46 to 51 per cent. of sulphur; American, from 42 to 44 per cent.

Sulphate of Ammonia.—Moderate trading at $2.85 @2.87 1-2 per 100 lbs. for 24@25 per cent. gas liquor.

Nitrate of Soda.—Particularly strong, owing to interference with shipments by the labor troubles in Chile. Demand in Europe has improved and the higher prices there have influenced the market in America. Spot is quoted at $2.10 per 100 lbs. and futures at $2, being the highest prices in a long time.

Concerning the Chilean market we are advised by Messrs. Jackson Bros., Valparaiso, under date of December 28, that producers have been more willing to meet buyers and for prompt delivery prices have dropped 1½d. per qtl. without encountering much demand. For January and February delivery sales of 95 per cent have been made at 6s. 7½d., and for April-May at 6s. 4½d. alongside terms. In 96 per cent, the price of 6s. 9d. for prompt and 6s. 8½d. alongside for January-February has been accepted. During the last few days owing to strikes of loading gangs and railway brakemen in Iquique, shipment of nitrate has been suspended in that port, and most producers have not been willing to operate. We quote 95 per cent for prompt 6s. 7½d.; January-February, 6s. 7d.; March, 6s. 6d.; April-May, 6s. 4½d., and 96 per cent January-February, 6s. 8d., all ordinary terms, sellers. The price of 6s. 7½d., with an all round freight of 25s. stands in 8s. 7½d. per cwt. net cost and freight without purchasing commission. Reported sales for the fortnight ending December 28, aggregated 295,000 qtls., and re-sales, 33,000 qtls.

Phosphates.—New foreign orders are comparatively few, but prices continue unchanged. The next few months will likely see a big export movement, as last year over 185,000 tons were reported from February 1 to April 30. In the producing fields a businesslike policy is being followed, namely, to regulate production according to demand, and thus avoid a heavy accumulation of stocks that must eventually react on prices.

Phosphates.	Per ton F. o. b.	C. i. f. Un'd Kingdom or European Ports. Unit.	Long ton.
*Fla. hard rock (77@80%).	$7.50	7 @7¼d	$10.92@11.31
*Fla land peb. (68@73%).	3.00@3.25	5 @6d	7.00@ 8.40
*Fla. Peace Riv. (58@63%)	2.25@2.50	5 @5½d	6.00@ 6.60
†Tenn....(78@80%), export.	3.50	6¾@7d	10.53@10.92
†Tenn.....78% domestic.	3.00@3.25	.....	.....
†Tenn.....75% domestic.	2.75@3.00	.....	.....
†Tenn....70@72% domestic	2.25@2.50	.....	.....
‡So. Car. land rock.....	3.25	4½@5d	5.67@ 6.30
†So. Car. river rock.....	2.75@3.25	.....	.....
Algerian, rock...(63@70%).	.....	6 @6½d	8.04@ 8.70
Algerian, rock..(58@63%).	.....	5 @5¼d	6.00@ 6.30
Tunis, Gafsa...(58@63%).	.....	5 @5¼d	6.00@ 6.30

*Fernandina, Brunswick or Savannah. †Mt. Pleasant. ‡On vessels Ashley River.

Acid phosphate is quoted at 57½@60c. per unit

LIVERPOOL. Jan. 15.

(*Special Report of Joseph P. Brunner & Co.*)

There is little export business reported in the ordinary lines of heavy chemicals, while at the same time prices are steadily maintained. The following are exports of bleaching powder and soda compounds, for the month of December last, also for the 12 months ending December 31, 1901, taken from the Board of Trade returns recently issued.

Bleaching Powder.	December, Cwts.	Jan.-Dec. Cwts.
Total exports	84,325	1,027,022
Exports to United States alone	63,555	723,841
Soda compounds:		
Soda ash	87,922	1,288,334
Soda, caustic	78,022	1,115,022
Soda, bicarb	23,541	293,693
Soda crystals	12,581	205,840
Soda, sulphate	45,069	556,475
Soda, other sorts	21,434	258,458
Total	269,259	3,718,092

The total shipments of bleaching powder during the past 12 months show a considerable decrease as compared with the same period of 1900, the falling off in exports to the United States amounting to 7,843 tons and to other countries 4,176 tons.

As regards soda compounds, however, the shipments for the 12 months show an increase of 3,120 tons as compared with the exports classified under the head of alkali for 1900. Soda ash is quiet, at usual varying prices as to export market. For tierces, nearest spot range may be called about as follows: Leblanc ash, 48 per cent, £5 15s.@£6; 58 per cent, £6 2s. 6d.@£6 7s. 6d. per ton net cash; Ammonia ash, 48 per cent, £4 10s.@£4 15s.; 58 per cent, £4 15s.@£5 per ton net cash; bags, 5s. per ton under price for tierces. Soda crystals are in good jobbing demand for home consumption, but not much is doing for export. For barrels, £3 7s. 6d. per ton, less 5 per cent is quoted for most quarters, with special terms for certain export markets. Caustic soda is in light export demand, bue prices are steady, as follows: Sixty per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton net cash. Bleaching powder dull, while at the same time there is little unbarred makes to be bad, and for hardwood £6 15s.@£6 17s. 6d. per ton net cash is still nearest range, with special terms for certain export quarters.

Chlorate of potash is inactive at nominally 3⅛d. per lb. net cash.

Bicarb. soda is still held for most markets at £6 15s. per ton, less 2½ per cent for the finest quality in 1 cwt. kegs, with usual allowances for larger packages, also special terms for a few favored markets.

Sulphate of ammonia is strong and excited and nearest spot values are now £11 10s.@£11 12s. 6d. per ton, less 2½ per cent for good gray, 24@25 per cent in double bags f. o. b. here, and it is not easy to find sellers at the moment even at the advance.

Nitrate of soda, although only in moderate demand on spot, is dearer at £9 15s.@£10 per ton, less 2½ per cent, for double bags f. o. b. here, as to quality and quantity.

METAL MARKET.

New York. Jan. 30.

GOLD AND SILVER.

Gold and Silver Exports and Imports.
At all United States Ports in December and Year.

	December. 1900	December. 1901	Year. 1900	Year. 1901
Gold.				
Exports....	$410,533	$4,744,073	$54,134,623	$57,729,889
Imports....	3,386,611	2,410,966	66,749,084	54,381,882
Excess. I.	$2,976,078	E. $2,333,107	I. $12,614,461	E. $3,348,007
Silver.				
Exports....	$7,358,339	$4,723,982	$66,221,694	$55,638,501
Imports....	3,117,857	2,784,757	40,100,343	31,142,949
Excess. E.	$4,240,482	E. $1,939,225	E. $26,121,321	E. $24 495,552

These figures include the exports and imports at all United States ports, and are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending January 29, 1902, and for years from January 1, 1902, 1901 and 1900.

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess Exports or Imports.
Week...	$37,091	$21,076	$963,408	$14,635	E. $964,788
1902.....	1,954,495	72,003	3,872,371	197,317	E. 5,646,946
1901.....	8,873,690	239,502	3,283,305	383,902	E. 11,553,591
1900.....	1,169,128	620,397	3,425,970	315,496	E. 3,689,205

The gold exported this week went to the West Indies and South America, while of the silver, $231,760 went to France, and the balance, chiefly to London. The gold and silver imported came from Central and South America and the West Indies.

Financial Notes of the Week.

Business generally shows little change from last week. The speculative markets are somewhat more active. In London the reported negotiations for peace in South Africa have caused a good deal of excitement on the Stock Exchange.

The statement of the New York Banks, including the 63 banks represented in the Clearing House, for the week ending January 25, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts	$688,332,800	$841,367,300	$869,942,600
Deposits	780,526,100	937,423,000	949,666,800
Circulation	16,637,100	31,253,200	31,713,900
Specie	157,762,500	191,710,200	185,891,200
Legal tenders	66,647,000	73,445,000	76,857,900
Total reserve	$224,409,500	$265,155,200	$262,749,100
Legal requirements	195,131,525	234,355,750	237,416,700
Balance surplus	$29,277,975	$30,799,450	$25,332,400

Changes for the week this year were, increases of $2,413,500 in loans and discounts; $10,944,600 in deposits; $8,725,900 in specie, $281,200 in legal tenders, and $6,270,950 in surplus reserve; a decrease of $281,700 in circulation.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding date last year:

	1901. Gold.	1901. Silver.	1902. Gold.	1902. Silver.
N. Y. A'd.	$191,710,200	.....	$185,891,200	.....
England ...	161,485,480	.....	179,794,215	.....
France	469,107,175	$219,530,805	490,617,530	$219,503,000
Germany ..	142,750,000	73,540,000	154,100,000	79,385,000
Spain	70,005,000	82,410,000	70,145,000	87,195,000
Nethl'ds ..	25,090,000	27,965,000	28,665,000	31,597,500
Belgium ..	14,930,000	7,465,000	15,803,335	7,901,665
Italy	77,640,000	9,265,000	80,500,000	10,312,500
Russia	357,110,000	30,530,000	341,245,000	30,920,000

The returns of the Associated Banks of New York are of date January 25, and the others January 23, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Demand for silver has been good but supply has been equal to all calls, and there does not seem to be any prospect of a rise worthy of note in the near future, unless it be rumor of a French tender expected in a couple of weeks.

Receipts of silver at the United States Assay Office in New York for the week ending January 30 were 33,000 oz.

Shipments of silver from London to the East for the year up to January 16 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India	£439,500	£344,720	D. £94,780
China	44,375	....	D. 44,375
The Straits	....	....	D. ....
Total	£483,875	£344,720	D. £139,155

Arrivals for the week, this year, were £79,000 in bar silver from New York, £4,000 from Chile, £2,000 from the West Indies and £13,000 from Australia; total, £98,000. Shipments were £72,500 in bar silver to Bombay and £22,000 to Calcutta; total, £94,500.

Indian exchange continues strong owing to the continued demand for money in India and lighter shipments of silver. The Council bills offered in London were taken at an average price of 16.03d. per rupee. It is reported that currency is growing very scarce in India, and that some buying of silver for coinage may be expected before long.

The Treasury Department's estimate of the money in the United States on January 1, 1902, is as follows:

	Total.	In Treas.	In Circul.
Gold coin	$1,176,172,153	$262,800,534	$635,374,550
Gold certificates	.....	.....	277,997,069
Silver dollars	530,732,617	7,999,739	73,239,986
Silver certificates	...	...	449,492,852
Subsid. silver	91,975,381	6,914,287	85,061,094
Treasury notes of 1890	38,596,000	156,263	38,439,737
U. S. Notes	346,681,016	5,514,630	341,166,386
Currency certificates			
Nat. Bank Notes	360,289,726	10,433,450	349,856,276
Total	$2,544,446,893	$293,818,903	$2,250,627,990

The population of the United States January 1, 1902, estimated at 78,437,000; circulation per capita, $28.69. For redemption of outstanding certificates an exact equivalent in amount of the appropriate kinds of money is held in the Treasury, and is not included in the account of money held as assets of the Government. This statement of money held in the Treasury as assets of the Government does not include deposits of public money in National Bank repositories to the credit of the Treasurer of the United States, and amounting to $106,390,363. The amount of money in circulation January 1 was greater than that estimated on December 1 by $371,760; and greater than that reported January 1, 1901, by $77,376,111.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$0.44¼	$0.46
Peruvian soles and Chilean pesos	.40	.44
Victoria sovereigns	4.85	4.88
Twenty francs	3.84	3.88
Twenty marks	4.73	4.85
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

January.	Sterling E change	—Silver— N. Y. Cts.	London Pence.	—Copper— Lake Cts. per lb.	Electrolytic per lb.	London £ per ton.	Tin, cts. per lb.	Lead cts. per lb.	—Spelter— N.Y. cts. per lb.	St. L. cts. per lb.
24	4.86⅞	55¼	25 7/16	10¾ @11	10¾ @10¾	48¾	24	3.95 @4.	4.25	4.10
25	4.86⅞	55¼	25 7/16	10¾ @11	10⅝ @10¾	....	24	4.05 @4.10	4.25	4.10
27	4.86⅞	54⅞	25⅜	11 @11¼	10¾ @11	49¼	24	4.05 @4.10	4.20	4.05
28	4.86⅞	55¼	25 7/16	11¼ @11⅝	11 @11¾	49¾	23¾ @23¾	4.05 @4.10	4.20	4.05
29	4.86⅞	55⅜	25⅜	11¾ @12	11⅛ @11¾	51¼	@ 23⅞	4.05 @4.10	4.15	4.00
30	4.86⅞	55⅛	25 7/16	12¾ @12¾	12 @12⅛	54¼	23⅞	4.05 @4.10	4.15	4.00

London quotations are per long ton, (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes, is usually 0.25c lower than these figures.

Copper.—The better feeling about which we reported last week continues; in fact, the market has become quite buoyant. We understand that the leading interests have been free sellers, but have been unable to withstand the flood of orders which has been pouring in from all sides. Consumers and dealers alike evidently came to the conclusion that values had arrived at low ebb, and bought largely for prompt as well as future delivery. The range of prices during the week under review has naturally been very large, Lake copper advancing from 10¾c. up to 12½c.; electrolytic copper in cakes, wirebars and ingots from 10½c. up to 12¼c., in cathodes from 10¼c. to 12c.; casting copper at from 10¼c. up to 12⅛c. At the close, the demand continues unabated and it looks as if a further improvement were imminent.

The foreign market, which closed last week at £48 15s., opened on Monday at £49 5s.; advanced £2 on Wednesday, and another £3 on Thursday, but eased off slightly in the evening, the closing quotations being cabled as £54 5s.@£54 7s. 6d. for spot, £54 10s.@£54 12s. 6d. for three months.

Refined and manufactured sorts we quote at the close: English tough, £53 10s.@£54; best selected, £57 10s.@£58; strong sheets, £69@£70; India sheets, £68@£69; yellow metal, 6¼@6⅜d.

Exports of copper from New York and Baltimore in the week ending January 29, are reported by our special correspondents as follows: To Great Britain, 1,180 tons; Germany, 165; Holland, 75; Austria, 90; Sweden, 10; Italy, 5; total, 1,525 tons. Also 731 tons matte to Great Britain.

There were no imports this week.

Imports of copper into the United States for the year ending December 31 are reported by the Bureau of Statistics of the Treasury Department as follows, in long tons:

	1900.	1901.	Changes.
Copper, metallic	30,668	32,958	I. 2,290
Copper ores and matte	55,112	96,047	I. 40,935

The reports do not separate ores and matte, so that it is impossible to estimate the fine copper contained in this material.

Tin has ruled dull throughout the week, without any special feature. At the close, spot is selling at 23 7-8c, March and April at 23 3-4c.

The foreign market, which closed last week at £107, declined to £106 10s., and the closing quotations are cabled as £107@£107 2s. 6d. for spot, £103 10s.@£103 12s. 6d. for three months.

Imports of tin into the United States for the year ending December 31 are reported by the Bureau of Statistics of the Treasury Department as below. The figures are in long tons:

	1900.	1901.	Changes.
East Indies	15,172	18,238	I. 3,066
Australasia	195	242	I. 47
Great Britain	13,819	13,027	D. 792
Holland	1,894	1,467	D. 427
Other countries	165	312	I. 147
Totals	31,245	33,286	I. 2,041

There was a decrease in the imports made through Great Britain and Holland, but a considerable increase in those made directly from the East.

Lead.—On Saturday the American Smelting and Refining Company raised their prices 10c. per 100 lbs. all around, and also gave notice that in future they will only execute orders for spot delivery at 2 1-2c. per 100 lbs. extra. The demand, although quite satisfactory, is nothing out of the ordinary. The closing quotations are 3.95@4.05c. St. Louis; 4.05@4.10c., New York.

The foreign market is somewhat easier, Spanish lead being quoted at £10 17s. 6d.@£11, English lead at £11@£11 2s. 6d.

Imports of lead in all forms into the United States and re-exports of imported lead for the year ending December 31 are reported by the Bureau of Statistics of the Treasury Department as follows in short tons:

	1900.	1901.	Changes.
Lead, metallic	210	604	I. 394
Lead in ores and base bullion	114,187	111,817	D. 2,370
Total imports	114,397	112,421	D. 1,976
Re-exports	98,898	97,362	D. 1,536
Balance	15,499	15,059	D. 440

Of the imports in 1901 there were credited to Mexico 81,727 tons, or 73.0 per cent of the total, and to Canada 26,065 tons, or 23.3 per cent. Exports of domestic lead were 2,394 tons in 1901, against 997 tons in 1900.

Spelter.—Several of the producers having become free sellers, values declined. At the lower prices established, consumers, however, seem to take more interest in the article. The ruling quotations are 4c. St. Louis; 4.15c. New York.

The foreign market is very firm, good ordinaries being quoted at £17 2s. 6d., specials at £17 7s. 6d.

The exports of spelter or metallic zinc from the United States for the year ending December 31, 1901, were reported by the Bureau of Statistics at 86,770,221 lbs, against 44,802,577 lbs. in 1900. The decrease amounting to 38,032,356 lbs. shows the depressed condition of demand in Europe during the year. Exports of zinc ores for the year were 39,425 tons, against 37,355 tons in 1900, showing an increase of 1,870 lbs. last year.

Antimony.—Is without any change. We quote Cookson's at 10c.; Hallett's at 8c.; Hungarian, Italian, Japanese and U. S. Star at 7 3-4c.

Imports of antimony into the United States for the year ending December 31 were as follows, in pounds:

	1900.	1901.	Changes.
Metal and regulus	3,632,843	3,674,923	I. 42,080
Antimony ore	6,035,734	1,731,956	D. 4,303,778

There was a small increase in metal imported, but a very large decrease in ores.

Nickel.—The price continues firm at 50@60c. per lbs., according to size and terms of order.

Exports of nickel oxide and nickel matte from the United States in the year 1901 were 5,869,655 lbs., against 5,869,906 lbs. in 1900; a decrease of 251 lbs. only. This nickel is refined here chiefly from Canadian matte; although some was made from New Caledonia ores.

Platinum.—Consumption continues good. Ingot platinum in large lots brings $19.50 per oz., in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 82c. per gram.

Imports of platinum into the United States for the year ending December 31, 1901, were 6,166 lbs., against 7,606 lbs. in 1900, showing a decrease of 1,440 lbs. last year.

Quicksilver.—This metal is now quoted at $48 per flask New York for large lots, with a slightly higher figure for small orders. San Francisco quotations are $47.25@$48 per flask for domestic orders, and $43.50 @$44 for export. The London price is now £8 15s. per flask with the same figure quoted from second hands.

Exports of quicksilver from all United States ports for the year ending December 31, 1901, are reported by the Bureau of Statistics at 858,228 lbs., against 80,037 lbs. last year.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

	Per lb.		Per lb.
Aluminum.		Ferro-Tungsten (37%)	28c.
No. 1, 99% ingots	33@37c.	Magnesium	$2.75 @ $
No. 2, 90% ingots	31@34c.	Manganese (over 90%)	$1.00
Rolled sheets	4c. up	Mangan'e Cop. (20% Mn)	32c.
Alum-brone	20@23c.	Mangan'e Cop (30% Mn)	38c.
Nickel-alum	33@39c.	Molybdenum (Best)	$1.82
Bismuth	$1.50	Phosphorus	50c.
Chromium (over 90%)	1.00	American	70c.
Copper, red oxide	50c.	Sodium metal	50c.
Ferro-Molyb'um (50%)	$1.25	Tungsten (Best)	62c
Ferro-Titanium (10%)	90c.		
Ferro-Titanium (20%)	$1.10		

Variations in prices depend chiefly on the size of the order.

Average Prices of Metals per lb., New York

Month.	—Copper.— 1901.	1900.	——Tin.—— 1901.	1900.	—Lead.—— 1901.	1900.	Spelter.— 1901.	1900.
January	16.25	15.58	26.51	27.07	4.35	4.68	4.13	4.65
February	16.38	15.78	26.68	30.58	4.35	4.675	4.01	4.64
March	16.42	16.29	26.03	32.90	4.35	4.675	3.91	4.60
April	16.43	16.76	25.93	30.90	4.35	4.675	3.98	4.71
May	16.41	16.34	27.12	29.37	4.35	4.181	4.04	4.53
June	16.38	15.75	28.60	30.50	4.35	3.901	3.99	4.29
July	16.31	15.97	27.85	33.10	4.35	4.030	3.95	4.28
August	16.25	16.35	26.78	31.28	4.35	4.250	3.99	4.17
September	16.25	16.44	25.31	29.42	4.35	4.350	4.08	4.11
October	16.25	16.37	26.62	28.54	4.35	4.350	4.23	4.15
November	16.224	16.40	26.67	28.25	4.35	4.350	4.29	4.29
December	13,845	16.31	24.36	28.94	4.153	4.350	4.31	4.28
Year	16.117	16.19	26.54	29.90	4.334	4.37	4.08	4.39

The prices given in the table for copper are the averages for electrolytic copper. The average price for Lake copper for the year 1900 was 16.52s.; for the month of January, 1901, it was 16.77c.; for February, 16.90c.; for March, 16.94c.; for April, 16.94c.; for May, 16.94c.; for June, 16.90c.; for July, 16.61c.; for August, 16.50c; for September, 16.54c.; for October, 16.60c.; for November, 16.333c.; for December, 14.36c.; for the year 1901, 16.53c.

Average Prices of Silver, per oz., Troy.

Month.	1901. London. Pence.	N. Y. Cents.	1900. London. Pence.	N. Y. Cents.	1899. London. Pence.	N. Y. Cents.
January	28.97	62.82	27.30	59.30	27.42	59.36
February	28.13	61.06	27.49	59.76	27.44	59.42
March	27.04	60.63	27.59	59.81	27.48	59.64
April	27.30	59.29	27.41	59.59	27.65	60.10
May	27.43	59.64	27.56	59.96	28.15	61.23
June	27.42	59.57	27.81	60.42	27.77	60.43
July	26.96	58.46	28.23	61.25	27.71	60.26
August	26.94	58.37	28.13	61.14	27.62	60.00
September	26.95	58.26	28.85	62.63	27.15	58.89
October	26.62	57.59	29.58	63.83	26.70	57.98
November	26.12	56.64	29.66	64.04	27.02	58.67
December	25.46	55.10	29.68	64.14	27.21	58.99
Year	27.11	58.95	28.27	61.33	27.44	59.58

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

UNITED STATES.

Articles. Long tons.	November. Imports.	Exports.	Eleven months. Imports.	Exports. Foreign.	Domestic.
Ores and Metals.					
Antimony	100	.....	1,489	.....	.....
Antimony ore	41	.....	771	22	.....
Copper	2,434	5,683	30,304	5,581	77,761
Copper ore, matte	12,001	2,490	89,309	9,484	15,628
Iron and Steel:					
Bar, rods	3,068	4,296	34,472	64	49,419
Billets, blooms	522	90	7,124	3	27,286
Hoops, bands	128	27	2,989	.....	1,059
Pig iron	13,958	18,054	53,289	160	75,810
Nails and spikes	.....	1,106	.....	.....	27,576
Rails	303	16,852	1,388	.....	303,133
Scrap	2,585	1,047	19,039	3,331	13,598
Sheet, plates	677	872	4,995	104	28,958
Wire	491	8,956	3,848	28	79,332
Miscellaneous	79	4,822	434	13	49,089
Iron ore	79,790	4,024	887,337	.....	64,558
Lead	301	2	531	22	2,112
Lead ore, bullion	9,653	4,694	94,042	80,991	.....
Mang. ore, oxide	2,551	.....	144,542	106	.....
Nickel ore, matte	31	221	28,002	.....	2,473
Quicksilver	.....	19	.....	.....	337
Tin	2,178	14	30,376	908	.....
Tin & black plates	7,182	4	67,103	143	429
Zinc	1	99	330	.....	2,597
Zinc ore	.....	2,375	.....	.....	35,392
Minerals.					
Asphalt	10,212	1,485	125,590	1,698	.....
Brimstone	14,679	26	143,750	182	.....
Cement	21,337	5,363	153,886	6,624	72,259
Coal, anthracite	.....	120,754	.....	7	1,889,438
Coal, bituminous	173,788	410,268	1,745,636	3,457	5,043,221
Coke	.....	38,108	.....	.....	360,744
Copper, sulphate	.....	21	.....	.....	21,136
Graphite	865	.....	13,215	3	.....
Nitrate of soda	21,563	251	190,810	2,050	.....
Phosphate rock	17,698	47,752	157,621	71	696,161
Pyrites	25,371	.....	357,191	.....	.....
Salt	6,197	425	155,576	1,519	8,188

The figures for copper are those given by the Treasury Department. The statement made by Mr. John Stanton for the Associated Copper Companies will be found monthly in our metal market. These figures give the exports for November as 6,069 long tons, eleven months, 80,195 tons.

Import Duties.

Metals.—The duties on metals under the present tariff law are as follows: Antimony, metal or regulus, ¾c. a lb. Lead 1½c. a lb. on lead ores; 2¼c. a lb. on pigs, bars, etc., 2½c. on sheet pipe and manufactured forms. Nickel, 6c. a lb. Quicksilver, 7c. a lb. Spelter or zinc, 1½c. a lb. on pigs and bars, 2c. on sheets, etc. Copper, tin and platinum are free of duty.

Minerals.—Duties are: Asphalt, crude, $1.50 per ton, and refined $3 per ton. Coal, bituminous, 67c. long ton; coke, 20c. ad. val. Cement, Roman, Portland and hydraulic, in bulk, 8c. per 100 lbs., and in packages 7c. Copper sulphate, ½c. a lb. Salt in bulk, 8c. per 100 lbs., and in bags, etc., 12c. Brimstone, anthracite coal, graphite, phosphate rock, pyrites and nitrate of soda are free of duty.

DIVIDENDS.

GOLD, SILVER, COPPER, LEAD, QUICKSILVER AND ZINC COMPANIES.

Name and Location of Company.		Authorized Capital Stock.	Shares. Issued.	Par Val	Dividends. Paid 1902	Total to Date.	Latest. Date	Amt.
Aberdeen, c.	N. M.	$1,000,000	32,175	$25		$32,175	Nov '00.	$1.00
Adams, s. l. c.	Colo.	1,500,000	150,000	10		716,000	Oct. 1901	.05
Aetna Con., q.	Cal.	500,000	100,000	5		225,000	Apr. 1901	.15
Alaska Goldfields.	Alaska.	1,500,000	250,000	5		260,000	Jan. 1901	.54
Alaska-Mexican, g.	Alaska.	1,000,000	180,000	5		465,381	Oct. 1900	.10
Alaska-Treadwell, g.	Alaska.	5,000,000	200,000	25	$75,000	4,895,000	Jan. 1902	.37½
Amalgamated, c.	Mont.	155,000,000	1,538,879	100	1,538,879	17,348,370	Jan. 1902	1.00
Am. Sm. & Ref.	U. S.	50,000,000	500,000	100	875,000	6,266,553	Jan. 1902	1.75
Am. Zinc, L. & Sm.	Mo.	2,500,000	60,000	25		180,000	Jan. 1900	1.00
Anaconda, c.	Mont.	30,000,000	1,200,000	25		19,350,000	Apr. 1901	2.00
Arizona, c.	Ariz.	3,775,000				2,330,000	Nov. 1901	17.50
Atlantic, c.	Mich.	1,000,000	40,000	25		940,000	Feb. 1901	2.00
Bald Butte, g. s.	Mont.	250,000	250,000	1	15,000	1,132,148	Jan. 1902	.05
Boston, q.	Cal.	1,000,000	100,000	10		20,000	Jan. 1900	.10
Boston & Colo Sm.	Colo.	750,000	15,000	50	11,250	371,350	Jan. 1902	.75
Boston Gold Copper. Sm.	Colo.	1,000,000	1,000,000	1		150,000	Nov. 1901	.02½
Boston-Little Circle, z. l.	Mo.	100,000	100,000	1		112,500	Oct. 1901	.25
Boston & Mont. Con., c. s. g.	Mont.	3,750,000	150,000	25		26,225,000	Dec. 1901	5.00
Breece, l. s.	Colo.	5,000,000	200,000	25		170,000	Dec. 1901	.20
Buffalo Hump, g.	Idaho.	1,000,000	100,000	10		300,000	Jan. 1901	.10
Bullion-Beck & Champion	Utah.	1,000,000	100,000	10		2,498,400	June. 1900	.10
Bunker Hill & Sullivan	Idaho.	3,000,000	300,000	10	21,000	1,305,000	Jan. 1902	.07
Butte & Boston, c.	Mont.	2,000,000	200,000	10		1,600,000	Nov. 1901	3.00
Butterfly & Terrible, g.	Colo.	1,500,000	1,250,000	1		31,250	Oct. 1901	.00½
Calumet & Hecla, c.	Mich.	2,500,000	100,000	25	1,000,000	78,350,000	Jan. 1902	10.00
Carisa g. s. c.	Utah.	500,000	500,000	1		30,000	Nov. 1901	.03
Centennial Eureka, g. s. l. c.	Utah.	5,000,000	100,000	25	50,000	2,667,700	Jan. 1902	.50
Center Creek, l. z.	Mo.	1,000,000	100,000	10		60,000	July. 1901	.10
Central Eureka, g.	Cal.	4,000,000	398,495	10		15,750	Sept. 1901	.02½
Central Lead, l.	Mo.	1,000,000	10,000	100	5,000	272,000	Jan. 1902	.50
Cherry Hill, g.	Cal.	1,000,000	1,000,000	1	2,500	35,000	Jan. 1902	.00¼
Con. Cal. & Va., s. g.	Nev.	540,000	216,000	2½		3,903,890	July. 1901	.10
Con. Mercur (New), g.	Utah.	5,000,000	1,000,000	5	125,000	210,000	Feb. 1902	.12½
Consol. (New), g.	Colo.	2,500,000	1,900,000	1	19,000	342,000	Jan. 1901	.01
Creede & Crip. Ck., g.	Colo.	800,000	800,000	1		16,000	May. 1901	.02
Croesus, g.	Cal.	1,000,000	200,000	5		227,300	Aug. 1901	.05
Crowned King, g. s.	Ariz.	6,000,000	600,000	10		242,700	May. 1901	.02
Dalton & Lark, g. s. l.	Utah.	2,500,000	2,500,000	1		350,000	July. 1901	.10½
Daly-West.	Utah.	3,000,000	150,000	20	60,000	1,267,500	Jan. 1902	.40
De Lamar, g. s.	Idaho.	2,000,000	400,000	5		2,583,000	Dec. 1901	.24
Dewey Con., g.	Utah.	10,000	10,000	1		5,850	June. 1901	.10
Doctor Jack Pot Con., g.	Colo.	3,000,000	2,900,000	1		232,000	Aug. 1901	.01
Doe Run, l.	Mo.	1,500,000	10,000	100	15,000	492,072	Jan. 1902	1.50
Ducktown, c. i. sul. (Ord).	Tenn.	375,000	6,000	50		133,750	Nov. 1900	2.50
Ducktown (Fndr).	Tenn.	1,000	200	5		41,250	May. 1900	162.50
Elkton Con., g.	Colo.	3,000,000	2,500,000	1		1,304,461	Dec. 1901	.04
Empire State-Idaho, l. s.	Idaho.	6,000,000	505,542	10	25,277	1,283,615	Jan. 1902	.05
Empire Con. q.	Cal.	5,000,000	50,000	100	150,000	150,000	Jan. 1902	.30
Ferris-Haggarty, c.	Wyo.	1,000,000	1,000,000	1		15,000	Sept. 1901	.01
Florence, s.	Mont.	2,500,000	400,000	5		223,780	Mar. 1900	.05
Gemini	Utah.	500,000	5,000	100		700,000	Aug. 1900	10.00
Gold Coin of Victor, g.	Colo.	1,000,000	1,000,000	1	30,000	990,000	Jan. 1902	.03
Gold King, g.	Colo.	1,000,000	938,850	1		412,214	July. 1901	.03
Golden Cycle, g.	Colo.	1,000,000	200,000	5		408,500	Mar. 1901	.05
Golden Eagle, g.	Colo.	500,000	489,015	1		98,916	Sept. 1901	.01
Grand Central, g.	Utah.	250,000	250,000	1		691,250	Nov. 1900	.10
Grass Valley Expl.	Cal.	100,000	30,000	2		30,000	Jan. 1900	.25
Gr. Gold Belt, g.	Colo.	5,000,000	3,800,000	1		76,000	June. 1900	.02
Gwin, g.	Cal.	1,000,000	100,000	10	5,000	276,500	Jan. 1902	.05
Hecla, l. s.	Idaho.	250,000	1,000,000	¼		100,000	Dec. 1900	.02
Hecla Con., s. l.	Mont.	1,500,000	30,000	50		2,250,000	July. 1901	.50
Helena Con., g.	Ore.	1,500,000	1,200,000	1	6,000	122,500	Jan. 1902	.00½
Hidden Treasure, g.	Cal.	330,000	33,000	10		457,452	Sept. 1900	.10
Holy Terror, g.	S. D.	500,000	500,000	1		172,000	Jan. 1900	.01
Homestake, g.	S. D.	21,000,000	210,000	100	105,000	10,768,750	Jan. 1902	.50
Horn Silver, g. s. c. z. l.	Utah.	10,000,000	400,000	25		5,312,000	Dec. 1901	.10
Independence Con., g.	Colo.	2,500,000	2,500,000	1		281,375	Apr. 1901	.04
Ingham Con., g.	Colo.	750,000	1,359,000	½		33,981	Aug. 1901	.00¼
Iowa, g. s. l.	Colo.	1,666,667	1,666,667	1	16,667	220,188	Jan. 1902	.01
Iron Silver.	Colo.	10,000,000	500,000	20		2,550,000	Dec. 1900	.10
Isabella, g.	Colo.	2,250,000	2,250,000	1		742,500	Mar. 1901	.01
Jamison, g.	Cal.	3,000,000	300,000	10		62,400	Sept. 1901	.03
Katinka, g.	Colo.	1,000,000	1,000,000	1		10,000	Nov. 1901	.01
Kendrick & Gelder Sm.	Colo.	1,000,000	1,000,000	1		20,000	Dec. 1901	.01
Kennedy, g.	Cal.	10,000,000	100,000	100		1,801,000	June 1901	.05
La Fortuna, g.	Ariz.	250,000	250,000	1	12,500	1,078,500	Jan. 1902	.05
Lake City, g.	Colo.	50,000	50,000	1		3,875	May. 1900	.01
Last Dollar, g.	Colo.	1,500,000	1,500,000	1		180,000	Dec. 1901	.02
Lightner, g.	Cal.	125,000	102,255	1		28,117	May. 1901	.10
Lillie, g.	Colo.	1,250,000	250,000	5		349,183	Apr. 1900	.05
Mammoth, g. s. c.	Utah.	10,000,000	400,000	25		1,840,000	July. 1901	.05
Mary McKinney, g.	Colo.	1,000,000	1,000,000	1	30,000	360,000	Jan. 1902	.03
May Day, g.	Utah.	100,000	400,000	¼	4,000	22,000	Jan. 1902	.01
Midget, g.	Colo.	1,000,000	1,000,000	1		165,000	July. 1901	.15
Modoc, g. s.	Colo.	500,000	500,000	1	5,000	235,000	Jan. 1902	.01
Mont. Ore Purch'g.	Mont.	2,500,000	81,000	25		2,322,000	Nov. 1901	2.00
Monument, g.	Colo.	300,000	300,000	1		21,124	Feb. 1901	.01
Morning Star Drift, g.	Cal.	240,000	2,400	100		854,400	Sept. 1900	3.00
Mountain, c.	Cal.	6,250,000	250,000	25		3,033,750	Oct. 1901	1.20
Mt. Diable, s.	Nev.	500,000	50,000	100		260,271	Jan. 1900	.10
Napa Con., q.	Cal.	700,000	100,000	7	10,000	1,150,000	Jan. 1902	.10
National Lead, com.	U. S.	15,000,000	149,054	100		1,341,486	Mar. 1900	1.00
National Lead, pfd.	U. S.	15,000,000	149,040	100		11,883,560	Dec. 1901	1.75
New Idria, q.	Cal.	5,000,000	100,000	5	10,000	330,000	Jan. 1902	.10
New Jersey Zinc.	U. S.	10,000,000	100,000	100		3,200,000	Feb. 1901	4.00
New Leadville Home, g.	Colo.	2,000,000	2,000,000	1	12,500	259,300	Jan. 1902	.00⅝
New Zealand Con., g.	Colo.	1,000,000	675,000	1	7,650	114,300	Jan. 1902	.01
Nugget, g.	Colo.	1,000,000	991,000	1		84,730	July. 1901	.01
Old Colony Zinc & Sm.	Mo.	1,000,000	69,909	10		138,184	Nov. 1901	.25
Omega, g.	Cal.	1,500,000	1,200,000	1		18,188	June 1900	.01½
Ontario, s. l.	Utah.	15,000,000	150,000	100		14,737,000	Dec. 1901	.30
Osceola, c.	Mich.	2,500,000	96,150	25		4,247,300	Dec. 1901	3.00
Parrot, c.	Mont.	2,300,000	229,850	10	114,925	5,772,925	Jan. 1902	.50
Penn. Con., g.	Cal.	5,150,000	51,500	100		161,325	May. 1900	.10
Plumas Eureka, g.	Cal.	1,403,250	150,625	10		2,831,294	Apr. 1901	.24
Pointer, g.	Colo.	1,250,000	1,250,000	1		25,000	June 1901	.01
Portland, g.	Colo.	3,000,000	3,000,000	1	180,000	4,207,087	Jan. 1902	.06
Quicksilver, pfd.	Cal.	4,300,000	43,000	100		1,888,411	May. 1901	.50
Quincy, c.	Mich.	2,500,000	100,000	25	400,000	13,270,000	Feb. 1902	4.00
Quincy, l. s. g. c.	Utah.	75,000	125,000	½	125,000	850,000	Jan. 1902	1.00
Richmond, g. s. l.	Nev.	1,350,000	54,000	25		4,453,797	Dec. 1900	.24
Rocco-Homestake, g. s.	Nev.	300,000	300,000	1	4,500	58,500	Jan. 1902	.01½
Sacremento, g.	Utah.	5,000,000	1,000,000	5		133,000	Aug. 1901	.00½
St. Joseph, l.	Mo.	3,000,000	250,000	10		3,459,500	Dec. 1901	.15
Santa Rita, g.	Colo.	1,000,000	1,000,000	1		4,000	July. 1900	.02
Silver King, g. s. l.	Utah.	3,000,000	150,000	20	160,000	4,850,000	Jan. 1902	.66⅔
Silver Shield, g.	Utah.	300,000	300,000	1		4,500	Feb. 1901	.00½
Smuggler, s. l. z.	Colo.	1,000,000	1,000,000	1		2,155,000	Dec. 1901	.03
Southern Boy, g.	Colo.	1,250,000	875,000	1		17,500	May. 1900	.02
S. Swansea, s. l.	Utah.	300,000	275,000	1		167,500	Mar. 1901	.05
S. Winnie, g. s.	Colo.	250,000	250,000	1		15,000	Sept. 1901	.01
Standard Con., g. s.	Cal.	2,000,000	478,394	10	17,839	4,052,297	Feb. 1902	.10
Standard, s. l.	Idaho.	500,000	500,000	1	25,000	2,490,000	Jan. 1902	.05
Stratton's Independence, g.	Colo.	5,500,000	1,000,007	5	240,001	3,792,857	Jan. 1902	.24
Swansea, s. l.	Utah.	500,000	100,000	5		330,500	June 1901	.05
Tamarack, c.	Mich.	1,500,000	60,000	25		8,490,000	Dec. 1901	10.00
Tomboy (New), g. s.	Colo.	1,500,000	300,000	5		332,000	Dec. 1901	.48
Town Topics, g. c.	Colo.	1,000,000	1,000,000	1		15,000	Nov. 1901	.00½
Uncle Sam Con.	Utah.	500,000	500,000	1		45,000	Nov. 1901	.03
Union, z. l.	Kas.	500,000	300,000	1		16,000	July. 1901	.01
United, z. l., pfd.	Mo.	1,000,000	14,998	25	7,499	67,558	Jan. 1902	.50
United, com.	Mo.	5,000,000	74,990	5	3,749	3,749	Jan. 1902	.05
U. S. Red. & Ref., pf.	Colo.	4,000,000	40,000	100	60,000	60,000	Jan. 1902	1.50
Utah, g.	Utah.	1,000,000	100,000	10		193,000	Aug. 1901	.02
Utah Con., c.	Utah.	1,500,000	300,000	5		732,000	Dec. 1902	1.22
Vindicator Con., g.	Colo.	1,500,000	1,100,000	1	88,000	752,000	Jan. 1902	.08
Wolverine, c.	Mich.	1,500,000	60,000	25		750,000	Oct. 1901	2.00
Yankee Con., g. s. l.	Utah.	500,000	500,000	1	25,000	25,000	Jan. 1902	.05
Yellow Aster, g.	Cal.	1,000,000	100,000	10		450,000	Dec. 1900	.10
Zoe, g.	Colo.	1,500,000	1,500,000	1		7,500	Dec. 1900	.00½

COAL, IRON AND INDUSTRIALS.

Name and Location of Company.		Authorized Capital Stock.	Shares. Issued.	Par Val	Dividends. Paid 1902.	Total to Date.	Latest. Date.	Amt.
Ala. Coal & Iron, pfd.	Ala.	$2,500,000	$25,000	$100		$393,750	Dec. 1901	$1.75
Allis-Chalmers, pfd.	U. S.	25,000,000	182,500	100	$284,375	853,125	Feb. 1902	1.75
Altoona Coal & Coke.	Pa.	2,500,000	250,000	10		75,000	Jan. 1901	.30
American Agr. Chem., pfd.	U. S.	20,000,000	171,350	100		2,554,500	Oct. 1901	3.00
American Cement.	Pa.	2,100,000	200,000	10	80,000	380,000	Jan. 1902	.40
American Coal.	Md.	1,500,000	60,000	25		1,132,500	Sept. 1901	1.25
American Iron & Steel, com.	Pa.	17,000,000	34,000	50	5,100	480,200	Jan. 1902	.15
American Iron & Steel, pfd.	Pa.	3,000,000	60,000	50	37,500	359,000	Jan. 1902	.62½
Aztec Oil.	Cal.	250,000	135,000	1		12,100	Dec. 1901	.02
Bethlehem Steel.	Pa.	15,000,000	300,000	50		1,325,000	Sept. 1901	.25
California Oil & Gas.	Cal.	2,000,000	200,000	10		540,000	Sept. 1901	.70
Cambria Steel.	Pa.	50,000,000	1,000,000	50	750,000	4,500,000	Feb. 1902	.75
Central Oil.	W. Va.	1,500,000	60,000	25		67,500	May. 1901	.37½
Central Oil.	Cal.	1,000,000	800,000	1	24,000	160,247	Jan. 1902	.03
Central Pt. Con. Oil.	Cal.	200,000	100,000	1		45,000	Dec. 1901	.02
Colorado Fuel & Iron.	Colo.	38,000,000	230,000		402,500	1,240,000	Jan. 1902	1.75
Colorado Fuel & Iron, pfd.	Colo.	2,000,000	20,000	100	80,000	1,400,000	Feb. 1902	4.00
Consolidated Coal.	Md.	10,250,000	102,500	100	205,000	5,523,000	Feb. 1902	2.00
Consolidated Coal.	Ill.	5,000,000	50,000		50,000	160,000	Jan. 1902	1.00
Continental Oil.	Cal.	300,000	280,000	1		10,400	July. 1901	.01
Dabney Oil.	Cal.	1,000,000	1,000,000	1		10,000	May. 1901	.01
Empire Steel & Iron, pfd.	N. J.	5,000,000	23,700	100	35,550	284,400	Jan. 1902	1.50
Federal Chem., pf.	Ky.	1,500,000	15,000	100	22,500	22,500	Jan. 1902	1.50
Four Oil.	Cal.	300,000	300,000	1	3,000	18,000	Jan. 1902	.01
Fullerton Oil.	Cal.	25,000	25,000	1		750	June. 1901	.03
General Chem., com.	U. S.	12,500,000	71,679	100		700,982	Dec. 1901	1.00
General Chem., pfd.	U. S.	12,500,000	90,880	100		1,273,878	Oct. 1901	1.50
Globe Oil.	Cal.	600,000	600,000	1		3,000	Apr. 1901	.00½
Gray Eagle Oil	Cal.	250,000	100,000	2½		217,000	May. 1901	.47
Green Mountain, Oil.	Cal.	500,000	500,000	1		5,000	Oct. 1901	.01
Hanford Oil.	Cal.	20,000	2,000	10	2,000	8,000	Jan. 1902	1.00
Heywood Oil.	Tex.	800,000	800,000	1		32,000	Nov. 1901	.04
Home Oil.	Cal.	100,000	100,000	1	7,500	267,500	Jan. 1902	.07½
Homestake Oil.	Cal.	100,000	10,000	10		31,500	Aug. 1901	.15
Kern Oil.	Cal.	100,000	100,000	1		350,000	Dec. 1900	.25
Lehigh Coal & Nav.	Pa.	14,346,650	285,933	50		19,377,788	Nov. 1901	1.50
Los Angeles Oil & Trans.	Cal.	250,000	10,000	1		2,500	Feb. 1901	.25
Maryland Coal, pfd.	Md.	1,885,035	18,850	100		744,544	Dec. 1901	3.00
Monongahela R. Coal, pfd.	Pa.	10,000,000	198,300	50	347,165	1,388,660	Jan. 1902	1.75
Montana Coal & Coke.	Mont.	5,000,000	200,000	25		120,000	Oct. 1900	.03
National Salt, com.	U. S.	7,000,000	70,000	100		615,000	Nov. 1901	1.50
National Salt, pfd.	U. S.	5,000,000	50,000	100		875,000	Nov. 1901	1.75
New Central Coal.	Md.	1,000,000	50,000	20		510,000	Apr. 1900	.40
Oceanic Oil.	Cal.	100,000	100,000	1		2,000	Dec. 1900	.01
Ohio & Indiana National Gas.	U. S.	10,000,000	90,000	100		720,000	Dec. 1901	1.00
Oil City Petroleum.	Cal.	500,000	500,000	1		15,000	Nov. 1901	.02½
Pacific Coast Borax.	Cal.	2,000,000	19,000	100	19,000	1,008,500	Jan. 1902	1.00
Park Crude Oil.	Cal.	100,000	82,146	1		4,897	Sept. 1900	.01
Pennsylvania Salt Mfg.	Pa.	5,000,000	100,000	50		12,850,000	Sept. 1901	3.00
Penna. Steel, pf.	Pa.	25,000,000	165,000	100		577,500	Nov. 1901	3.50
Philadelphia Gas, com.	Pa.	14,752,131	295,042	50	221,282	1,817,111	Jan. 1902	.75
Philadelphia Gas, pfd.	Pa.	3,998,350	79,967	50		399,837	Aug. 1901	1.25
Pittsburg Coal, pfd.	Pa.	32,000,000	297,012	100	500,000	4,718,168	Jan. 1902	1.75
Producers' & Con. Oil.	Cal.	1,000,000	10,000	100		51,500	Mar. 1901	.10
Reed Crude Oil.	Cal.	2,000,000	2,000,000	1		50,000	Apr. 1901	.02½
Rep. Iron & Steel, pfd.	U. S.	25,000,000	203,069	100	355,371	3,553,709	Jan. 1902	1.75
San Joaquin Oil.	Cal.	100,000	100,000	1	10,000	30,000	Jan. 1902	.10
Shawmut Oil.	W. Va.	1,250,000	50,000	25		100,000	Nov. 1901	.50
Sloss-Sheffield Steel & Iron, pfd.	Ala.	20,000,000	67,000	100	117,250	925,000	Jan. 1902	1.75
So. Cal. Oil & Fuel.	Cal.	300,000	200,000	1		30,000	Nov. 1901	.01½
Stand. Oil (of N. J.).	U. S.	100,000,000	970,000	100		20,385,000	Dec. 1901	8.00
Senator Oil.	Cal.	200,000	180,920	1		5,420	Nov. 1901	.01
Sunday Lake Iron.	Mich.	1,000,000	40,000	25		40,000	Feb. 1901	1.00
Susquehan I. & S., pf.	Pa.	1,500,000	300,000	5	45,000	627,500	Jan. 1902	.15
Temple Iron.	Pa.	240,000	2,400	100	7,200	7,200	Jan. 1902	3.00
Tenn. C. I. & R. R., com.	Tenn.	23,000,000	225,536	100		1,102,144	Nov. 1900	2.00
Tenn. C. I. & R. R., pf.	Tenn.	248,000	2,480	100	4,960	237,840	Feb. 1902	2.00
Tex. & Pacific Coal.	Tex.	2,000,000	20,000	100	30,000	1,950,000	Jan. 1902	1.50
Thirty-three Oil.	Cal.	500,000	100,000	5	10,000	10,000	Jan. 1902	.10
Union Oil.	Cal.	10,000,000	52,672	100	71,107	189,618	Jan. 1902	1.35
U. S. Crude Oil.	Cal.	100,000	100,000	1		27,220	Dec. 1901	.02
U. S. Marble.	Wash.	2,000,000	2,000,000	1	15,000	53,750	Jan. 1902	.00¾
U. S. Oil.	U. S.	2,500,000	100,000	25		775,000	Oct. 1900	.50
U. S. Steel Corp., com.	U. S.	550,000,000	5,084,359	100	5,084,359	15,227,812	Mar. 1902	1.00
U. S. Steel Corp., pf.	U. S.	550,000,000	5,101,676	100	8,927,933	24,752,804	Feb. 1902	1.75
Va.-Caro Chem., com.	U. S.	38,000,000	279,844	100		1,650,000	Dec. 1901	1.00
Va.-Caro Chem., pf.	U. S.	12,000,000	120,000	100	240,000	5,340,000	Jan. 1902	2.00
Warner Oil.	Cal.	200,000	200,000	1		10,000	June 1901	.01
Westmoreland Cola.	Pa.	5,000,000	250,000	50		6,750,000	Oct. 1901	1.50
West Shore Oil.	Cal.	100,000	100,000	1		20,000	Dec. 1901	.05
Whittier Con. Oil.	Cal.	1,000,000	1,000,000	1		5,630	Dec. 1900	.01

CANADA, CENTRAL AND SOUTH AMERICA, MEXICO.

Name anp Location of Company.		Authorized Capital Stock	Shares. Issued	Par Val	Dividends. Paid 1902	Total to Date.	Latest. Date.	Amt.
Amistad y Concordia.	Mex.	$480,000	9,000	$50	$20,034	$36,064	Jan. 1902	$2.09
Athabasca, g.	B. C.	550,000	110,000	5		25,000	Oct. 1900	.23
Bosun, s. l.	B. C.	250,000	50,000	5		12,500	Apr. 1901	.25
Cariboo McKinney, g.	B. C.	1,250,000	1,250,000	1		478,087	Oct. 1900	.01½
Center Star, g.	B. C.	3,500,000	3,500,000	1		210,000	May. 1901	.01
Copiapo, c.	Chile.	1,125,000	112,500	10		2,826,000	Dec. 1901	.60
Dominion Coal.	N. S.	3,000,000	30,000	100	$120,000	2,040,000	Jan. 1902	4.00
Dominion I. & St., pf.	N. S.	5,000,000	50,000	100		175,000	Oct. 1901	3.50
El Oro, g. s.	Mex.	5,000,000	1,000,000	5		1,140,000	Dec. 1901	.36
Esperanza, s. g.	Mex.	150,000	3,000	50	13,050	933,630	Jan. 1902	4.35
Frontino & Bolivia c.	Colom.	643,310	128,662	5		1,211,703	July. 1901	.72
Goodenough, s. l.	B. C.	800,000	650,000	1	6,500	39,000	Jan. 1902	.01
Grand Central, g. s.	Mex.	1,500,000	250,000	5		840,000	Jan. 1900	.48
Guadalupe Mill.	Mex.	1,000,000	10,000	100		3,381,950	Nov. 1901	1.37
Greene Con., c.	Mex.	6,000,000	600,000	10		220,000	Sept. 1901	.20
Le Roi No. 2, g.	B. C.	3,000,000	120,000	25		144,000	June 1901	1.20
Mesquital.	Mex.	125,000	250,000	½		35,000	July. 1901	.08
Natividad, s. g.	Mex.	36,000	2,400	15		110,556	Sept. 1901	1.83
N. Y. & Hon. Ros., s. g.	C. A.	1,500,000	150,000	10	15,000	1,485,000	Jan. 1902	.10
North Star, s. l.	B. C.	1,500,000	1,300,000	1		253,500	Dec. 1901	.01½
Payne Con., s. l.	B. C.	3,000,000	2,000,000	1		1,438,000	Jan. 1901	.03
Penoles (Map.), s. l.	Mex.	125,000	2,500	50	55,375	1,405,925	Jan. 1902	22.15
Providencia (S. J.)	Mex.	90,000	6,000	15	5,220	105,350	Jan. 1902	.87
Rambler-Cariboo, s. l.	B. C.	1,250,000	1,250,000	1	12,500	100,500	Jan. 1902	.01
Reco, s. l.	B. C.	1,000,000	1,000,000	1		278,500	Aug. 1900	.10
St. John del Rey, g.	Brazil	3,000,000	425,000	5		13,736,107	June 1901	.24
San Carlos Minillas.	Mex.	12,500	2,500	5	11,075	223,254	Jan. 1902	4.43
Sorpressa.	Mex.	19,200	960	20	[illegible]	185,653	Dec. 1901	2.18
Sta. Maria de Guad.	Mex.	2,500	2,500	1	1,075	303,675	Feb. 1902	4.43
San Francisco Mill.	Mex.	150,000	6,060	25	[illegible]	225,740	Dec. 1901	.44
San Diego de Char.	Mex.	96,000	2,400	40		61,100	Nov. 1901	.83
St. Gertrudis.	Mex.	1,440,000	28,800	50	1,152	2,551,392	Jan. 1902	.04
San Rafael.	Mex.	60,000	2,400	25		1,719,508	Dec. 1901	3.48
St. Eugene Con.	B. C.	3,500,000	3,500,000	1		210,000	Apr. 1901	.03
War Eagle Con., g. s. c.	B. C.	2,000,000	1,750,000	1		545,250	Feb. 1900	.01½
Ymir, g.	B. C.	1,000,000	200,000	5		240,000	Nov. 1901	.24
Union Mill.	Mex.	150,000	3,060	50		352,620	Dec. 1901	2.18

STOCK QUOTATIONS.

NEW YORK.

Company and Location.	par val	Jan. 23. H.	Jan. 23. L.	Jan. 24. H.	Jan. 24. L.	Jan. 25. H.	Jan. 25. L.	Jan. 27. H.	Jan. 27. L.	Jan. 28. H.	Jan. 28. L.	Jan. 29. H.	Jan. 29. L.	Sales
Alamo, Colo.	$1													
Amalgamated c., Mont	100	70.88	69.75	72.13	70.50	72.38	71.00	73.88	71.38	76.88	74.00	77.63	69.50	437630
Anaconda c., Mont.	25	31.63	31.25	32.38	31.63	32.00	31.75	32.75	31.50	33.88	32.88	34.25	31.00	8,650
Anaconda Gold, Colo.	5									.26		.26		800
Argentum-Jun., Colo.	2	.15						.09	.08	.09	.08			4,500
Belcher, Nev.	3									.10				200
Best & Belcher, Nev.	3	.13												300
Breece, Colo	25													
Brunswick, Cal.	1											.08		200
Catalpa	10													
Chrysolite, Colo.	50	.05		.05	.04									
Comstock T., Nev.	100	.06		.06	.05½					.07		.06½		700
Comstock Bonds, Nev.	100			.07				.07						9,400
Comstock T., Scrip.	100			.10										3,000
Con. Cal. & Va., Nev.	2½	1.40						1.20		1.20				200
Creed & C. C., Colo.	1													750
CrippleCr. Con., Colo.	1					.10								
Elkton, Colo.	1							1.25		1.25				1,000
Hale & Norcross, Nev.	3							.32						700
Iron Silver, Colo.	20													600
Isabella, Colo.	1	.30		.30		.30		.28		.32		.32		
King & Penb., Ont.	10			.10										2,100
Mexican, Nev.	3	.30				.32		.33						50
Mollie Gibson, Colo.	5	.15		.15				.16						900
Ontario, Utah	100	8.50				8.00	7.88	8.50		8.00		8.50		1,700
Ophir, Nev.	3					.85		.83				.86		365
Phoenix, Ari.	1			.06								.07	.06	500
Portland, Colo.	10	2.65		2.65										2,100
Potosi, Nev.	3	.18												300
Quicksilver, Cal.	100									4.00				200
Quicksilver pf., Colo.	100									10.50				50
Savage, Nev.	2½													25
Small Hopes, Col	20													
Standard Con., Ca.	10			3.50										
Union Copper, N. C.	1	3.00	2.88	3.25	3.00	3.25	3.00	3.25	3.00	3.13	3.00	3.25	3.13	200
U. S. Red. & Ref., Colo.	100	38.00	37.63	38.00	37.63	37.25	37.50	38.25	38.00	38.25	38.00	38.38	38.25	
U.S.Red.&Ref.pf,Colo	100	62.50	61.50	62.50	61.50	63.00	62.00	63.50	62.88	64.00	63.00	64.00	63.63	
White Knob, Ida.	10	17.00	16.50	17.00	16.50	18.00	16.50	18.00	17.50	18.00	17.50	18.00	17.50	
Work, Colo.	1	.10	.09¼	.09½				.10				.09		3,50

Coal and Industrial Stocks.

Am. Agr. Chem., U.S.	100	22		22¼				37	20	29	22	22⅝	22	200
Am.Agr.Chem.pf,U.S.	100							99	82¾	89	83	89	83	
Am. Car & Fdy., U.S.	100	29⅝	29¼	29½	29¼	29¼		29		29½	29	29¾	29¼	3,520
Am. Car & Fdy. pf,U.S.	100	86	85¾	86		86½	86¾	86		85⅞	85⅛	85¾		1,012
Am. Sm. & Ref., U.S.	100	46¾	46⅛	48	46½	47⅛	47¼	48⅜	47⅛	49	47⅛	49⅝	47¾	35 700
Am. Sm. & Ref. pf,U.S.	100	97½	97	97½	97	97		97	96¾	97¼	97	98	97¼	8,433
Col. Fuel & I., Colo.	100			86	85⅞			85	84	86	85	86¾	85½	3,160
Col. & H. C. & I., Colo.	100	15		15	14¾							15		400
Int'l S. Pump, U.S.	100	49¼	49	50	49½	50		50	49⅝	53¼	50	52½	52	2,700
Int'l S. Pump pf, U.S.	100							89¼		88½				100
Mong. R. Coal, Pa.	100	13¾	13½	13¾	13½	13⅜				13¼	13⅜	13⅜		5,622
Mong. R. Coal pf, Pa.	100	44	43⅜	43¾	43½	43½								618
National Lead, U.S.	100	16¼	15⅜	16½	15⅜	17	16	19¼	17½	19⅜	19	19¼	18⅜	14,350
National Lead pf, U.S.	100	81	79	81	78	81	80	85	83	85½		86		1,420
National Salt, U.S.	100	30		30		30				30		30		100
National Salt pf, U.S.	100	66	63¼	66	63	66	63	63	61	66	60	66		400
Pittsburg Coal, Pa.	100	25½	25	25⅝	25					25⅞	25¼	25½		3,337
Pittsburg Coal pf, Pa.	100	90¼	90⅛	90¼	90	89⅛	89¾			90¼	90	90⅝	90	1,552
*Pressed Steel Car, Pa.	100	40	39⅞	40¼		40⅛	40¼			40⅞	40½	40¼		1,975
Republic I. & S., U.S.	100	16½	16¼	16⅝	16⅛			16½		16¼	16	16⅝	16¼	4,425
Republic I. & S., pf, U.S.	100	68¾		68¾		69	68¾	68¾		69⅛	69	69⅛	69	1,900
Sloss-Shef S. & I., Ala.	100	30	29½	30	29½	30	29½	30	29½	30	29½	30	29½	
Sloss-ShefS. & I.pf, Ala.	100	83	81	83	81	83	81	83	81	83	81	83	81	
Standard Oil, U.S.	100	653	648	665	660	655	645	653	648	653	648	653	648	200
Tenn. C. I. & R. R., Ala.	100	63¼	62½	63½	63	62¾	62¼	62	61¼	63½	62¼	64¾	63	7,250
U.S.Steel Corp.,U.S.	100	42¾	42⅜	42⅞	42¼	42⅝	42½	42½	42¼	43¼	42⅜	43½	42¾	51,920
U.S.Steel Corp.pf,U.S.	100	94¾	94⅜	93⅞	92¾	93⅞	92¾	92¾	92⅜	93¼	92¾	93¼	93	59,765
Va.-Car Chem., U.S.	100	61	59¼	61	59	61	59¾	61½	60	61	60	61	60	
Va.-Car Chem. pf,U.S.	100	123		122	120¾	122¾		123		122½		122¼	120¾	

Total sales 506,939 shares. † Ex-dividend.

PHILADELPHIA, PA. §

Name and Location of Company.	par val	Jan. 23. H.	Jan. 23. L.	Jan. 24. H.	Jan. 24. L.	Jan. 25. H.	Jan. 25. L.	Jan. 27. H.	Jan. 27. L.	Jan. 28. H.	Jan. 28. L.	Jan. 29. H.	Jan. 29. L.	Sales
Am. Alkali	$50			.38										1,100
Am. Cement	10	5.68	5.50			5.50		5.75	5.63					1,100
Beth. Iron, Pa.	50													
Beth. Steel, Pa.	50													
Cambria Iron, Pa.	50	48.00				47.75		48.00		48.00				80
Cambria Steel, Pa.	50	25.63	24.50	24.63	24.50	24.75	24.50	24.75	24.38	25.00	24.50	24.88	24.75	3,295
Susq. S. & S., Pa.	10					1.63		1.75		1.75		2.00	1.75	1,250
United Gas I., Pa.	50			116½		116½		116⅜	116	116	116⅜			100

§Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 7,095 shares.

MEXICO.

Jan. 18.

Name of Company.	Shares.	Last div'd	Prices. Bid.	Prices. Ask.
Durango:				
Ca. Min. de Penoles	2,500	$60.00	$3,830	$3,900
Augustias, Pozos	2,400	5.00	55	
Guanajuato:				
Cinco Senores y An., aviada	2,000	15.00	210	220
Cinco Senores y An., aviada	400	10.00	190	195
Providencia, SanJuan de la Luz	6,000	2.00	215	225
Guerrero:				
Garduno y Anexas.	7,200		30	50
Hidalgo:				
Amistad y Concordia.	9,600	4.71	47	48¼
Carmen, aviada	1,100		210	220
Ca. Real del Monte	2,554		450	550
El Encino, aviador	1,120		50	
Guadalupe Fresnillo y Annexas.	1,000		220	300
La Blanca, aviada.	1,536		350	370
La Blanco, aviada.	768		220	230
Maravillas y An., aviador.	1,680		200	250
Maravillas el Lobo	1,000		200	300
Palma y An., aviador.	1,800		15	25
Sta. Gertrudis y An., aviador	9,600		6	8
Sta. Gertrudis y An., aviador	28,800	0.50	62	64
Santo Tomas Apostol aviador	5,100		9	
San Rafael y An., aviada	1,200	12.00	650	700
San Rafael y An., aviada	1,200	8.00	320	349
Soledad, aviada	960	5.00	220	240
Sorpressa, aviada	960	5.00	240	250
Mexico:				
Alacran	2,400		$30	$40
La Esperanza (El Oro)	3,000	$10.00	950	980
Socovon de S. Fern.	2,500		20	30
Michoacan:				
Luz de Borda, aviador	3,000		28	35
Luz de Borda, aviada	1,000		5	7
San Luis Potosi:				
Concepcion y An.	3,000		120	125
El Barreno, aviador	2,000	2.00	30	32
Sta. Maria de la Pa.	2,400	15.00	530	545
Santa Fe.	2,400		20	30
San Diego y Annexas.	2,400	4.00	75	80
Zacatecas:				
Candelaria y Pinos	2,500		330	350
San Carlos y Annexas	2,500	10.00	415	425
Sta. Maria de Gaud.	2,500	10.00	308	312
Miscellaneous:				
Bartolome de Medina	2,000	2.00	45	60
Guadalupe Hacienda	10,000	3.00	215	220
La Luz Hac. (Pachuca)	6,000		30	35
La Reina (Chihuahua)	192		2,500	3,500
Naica (Chihuahua)	100		2,450	2,550
Natividad (Oaxaca) aviador	1,800	10.00	420	450
National (Oaxaca) aviador	1,800	4.00	400	500
San Francisco Hac.	6,000	1.00	150	155
Santa Ana Huantla Morelos	4,000		50	70
Union Hacienda	3,000	5.00	206	220

BOSTON, MASS.

Name of Company.	par val	Shares listed.	Jan. 23. H.	Jan. 23. L.	Jan. 24. H.	Jan. 24. L.	Jan. 25. H.	Jan. 25. L.	Jan. 27. H.	Jan. 27. L.	Jan. 28. H.	Jan. 28. L.	Jan. 29. H.	Jan. 29. L.	Sales.
Adventure Con., c	$25	100,000	20.00	19.25	20.50	20.00			21.00	20.00	21.50	21.00	23.00	21.25	1,759
Aetna Con., q.	5	100,000													
Allouez, c.	25	80,000			3.00		3.00		3.25	3.00	3.50	3.25	3.50	3.13	1,262
Amalgamated, c.	100	1,500,000	70.88	69.75	72.25	70.75	72.38	71.00	73.88	71.13	76.75	74.25	77.75	74.38	46,808
Am. Gold Dreg.	5	90,000													
Am. Z. L. & Sm.	25	60,000													
Anaconda, c.	25	1,200,000			32.25	32.00	32.13		32.25		33.50		33.25		200
Arcadian, c.	25	150,000	3.88		3.63	3.50			4.50	3.63	6.25	4.25	5.50	5.00	5,180
Arnold, c.	25	60,000													
Atlantic, c.	25	40,000	23.00	22.00	23.00	22.50	24.00	23.50	24.50	23.50	26.00	25.00	26.00	25.50	1,486
Baltic.	25	100,000	36.00	34.50	35.88	35.50	35.50		37.00	35.50	38.50	37.50	40.00	38.00	4,198
Bingham, Cons.	50	150,000	22.00	21.50	23.25	20.50	23.25	23.00	23.00	22.25	23.50	22.88	22.88	22.75	4,812
Bonanza Dev.	10	300,000													
Boston, q.	10	100,000													
British Columbia	5	200,000													
Cal. & Hecla, c.	25	100,000	580.	575.	585.		585.		590.	585.	600.	590.	615.	6.00	184
Catalpa	10	300,000													
Centennial, c.	25	90,000	11.75		12.50	12.25	12.50	11.75	12.13	11.50	13.75	12.50	14.00	13.00	4,075
Central Oil.	25	60,000													
Cochiti, g.	10	193,750	1.25	1.06	1.13		1.13		1.38	1.00	1.00	90.00	1.00	.75	4,935
Cons. Mercur, g.	5	1,000,000	1.50	1.38	1.50	1.38	1.75	1.50	1.88	1.75	1.88	1.62	1.75	1.50	9,705
Con. Zinc & L. M. S.	10	110,000													
Copper Range, c.	25	100,000	54.50	53.00	54.50	53.50	54.00		56.00	54.00	58.00	56.25	60.50	58.00	3,007
Daly-West.	20	150,000	29.00		30.00	28.00	28.25	27.00			25.88	25.00	26.13	26.00	1,377
Dominion Coal.	100	150,000	63.75	61.25	63.00		62.00	61.50	63.50	60.25	64.75	63.75	64.00	63.75	8,008
Dominion Coal, pf.	100	30,000	119.	118.	119.	118.							119.		38
Elm River, c.	12	100,000	2.38				2.50		2.25		2.50				520
Franklin, c.	25	100,000	12.25		12.50		12.50				14.50	13.00	14.50	14.00	910
Guanajuato Cons.	5	385,000	5.00	4.50	4.75		4.81	4.63	4.75	4.63	5.13	4.63	5.13	4.88	4,225
Humboldt, c.	25	40,000									33.00	32.25			
I. Royale Con., c.	25	150,000	21.00		21.00		21.50	21.00			22.00	21.50	21.50	21.00	1,120
Mass. Con., c.	25	100,000	17.63	17.00	18.38	17.50	17.50	17.00	17.38	17.00	18.25	17.50	18.88	17.75	7,472
Mayflower, c.	25	100,000							2.25		2.00		2.25		320
Michigan, c.	25	100,000	10.38	9.50	10.38	10.00	10.50	10.38	11.00	10.00			11.50	10.50	3,280
Mohawk, c.	25	100,000	30.50	29.50	31.00	30.50	31.00	30.00	32.25	30.50	11.00	10.38	35.00	33.75	3,366
Mont. C. & C.	25	200,000									33.00	32.25			
Mont'l & Boston	5	570,000	3.44	3.13	3.18	3.13	3.38	3.00	3.18	3.00			3.31	3 00	8,925
National.	25	100,000					1.00				3.25	3.18			350
N. E. Gas & Coke.	100	100,000	5.00												150
Old Colony, c	25	100,000	3.00		2 50						3.25	3.00	350		347
Old Dominion, c.	25	150,000	22.25	22.00	22.50	21.00	23.00	21.50	22.50	21.25	23.50	21.50	23.00	22.50	6,605
Osceola, c.	25	96,150	81.25	80.75	82.50	81.00	81.50	81.00	83.00	81.00	85.00	82.50	85.50	83.00	6,031
Parrot, s. c.	10	229,850	29.00		30.00				31.50	29.50	31.50	30.50	31.50	31.00	1,965
Phoenix Con., c.	25	100,000					4.25		4.00		4 00				350
Quincy, c.	25	100,000	135½	135.	139¾	139½	137½		1.39	137½	140.		140.		193
Rhode Island, c.	25	100,000					2.50		2.25	2.00	2.75	2.00	2.50		483
Santa Fe, g. c.	10	250,000	3.00	2.75	3.00		3.25		3.25	3.00	3.50	3.25	4.00	3.50	2,035
Santa Yabel	5	130,000							.50		.50				380
Shawmut Oil.	25	50,000													
Tamarack, c.	25	60,000			255.		255½	254.	259.	255.	2 60		260.	259.	356
Tecumseh, c.	25	80,000									1.50		1.75		300
Trimountain, c.	25	100,000	57.25	56.75	59.00	57.00	58.00				62.00	58.00	59.00		3,710
Trinity, c.	25	160,000	14.50	13.30	14.75	14.50	14.75	14.13	14.50	13.50	14.00	12.75	14.00	13.00	4,222
Union C. L.	25	80,000													
United States, g.	25	250,000	14.50		14.75	14.50	14.75	14 13	15.25	14.50	15.75		16.00	15.75	7,519
U. S. Oil.	25	100,000	11.63	11.38			12.00	11.50			11.50	24.00	12.00		346
Utah Con., g.	5	300,000	23.00	22.75	23.50	23.00	23.50		23.75	23.25	24.50	4.88	25.00	24 00	5,539
Victoria, g.	25	100,000	4.50		4.75		4.50		5.00	4.75	5.00		5.25	5.00	940
Washington, c.	25	60,000										1.50			
Winona, c.	25	100,000									2.00		1.50		575
Wolverine, c.	25	60,000	46.50	46.00	46.50				48.00	46.50	50 00	47.75	50.00	49.50	1,325
Wyandot, c.	25	100,000													

Official Quotations, Boston Stock Exchange. Total sales, 171,017 shares. †Ex-dividend. §Ex-asst. paid.

ST. LOUIS, MO.*

Jan. 2.7

Name.	Shares.	Par	Bid.	Ask.	Name.	Shares.	Par	Bid.	Ask.
Am.-Nettie, Colo.	300,000	$10	$1.15	$1.27	Doe Run Lead Co.	10,000	$100	$128.00	$135.00
Catherine Lead, Mo.	50.000	10	3.00	3.75	Granite Bimet. Mt.	1,000,000	10	2.60	2.75
Central Lead, Mo.	10,000	100	130.00	135.00	K. & Tex. Coal, Mo.	25,000	100	40.00	45.00
Columbia Lead, Mo.	50,000	10	12.50	13.00	Renault Lead, Mo.	30,000	10	9.00	10.00
Con. Coal, Ill.	50,000	100	20.00	21.00	St. Joe Lead, Mo.	300,000	10	15.00	20.00

*From our Special Correspondent.

SPOKANE, WASH.

Jan. 23.

Name of Company.	Par Val.	B.	A.	Sales.	Name of Company.	Par Val.	B.	A.	Sales.
Black Tail.	$1	.10⅜	.12⅛		Princess Maud.	$0.10	.02⅝	.03⅛	
Crystal.	1				Quilp.	1	.25	.40	
Deer Trail Con.	1	.01⅝	.02½		Rambler Cariboo.	0.25	.76	.80	3,000
Gold Ledge.	1	.01¾	.02	8,000	Reservation.	1	.01½	.02⅜	
Lone Pine-Surp. Con.	1	.06¼	.06⅝	16,000	Sullivan.	1	.07	.10	
Morning Glory.	0.10	.02¼	.03⅛	4,000	Tom Thumb.	1	.19¼	.22⅛	7,000
Mountain Lion.	1	.26	.28	7,000					

SALT LAKE CITY.*

Jan. 25.

Name of Company.	Location.	Shares.	Par Val.	Quotations. High.	Quotations. Low.	Sales.
Ajax.	Tintic	300,000	$10	$0.40½	$0.29	54,800
Anchor	Park City	150,000	10			
Bullion Beck	Tintic	100,000	10			
Carisa.	Tintic	500,000	1	.55	.36	59,400
Con. Mercur.	Mercur	1,000 000	5	1.50	1.47	1,880
Creole.	Park City	150,000	1			
Daly	Park City	150,000	20	292.15	272.15	200
Daly-West.	Park City	150,000	20	29.50	27.40	1,230
Dexter.	Tuscarora	200,000	5			
Eagle & B. Bell.	Tintic	250,000	1			
Grand Central.	Tintic	250,000	1	3.00		100
Horn Silver.	Frisco	400,000	25			
L. Mammoth.	Tintic	150,000	1	1.01	1.00	800
Mammoth.	Tintic	400,000	25	1.22	1.19	1,000
May Day.	Tintic	400,000	.25	.55	.44	28,200
Ontario.	Park City	150,000	100			
Sacramento	Mercur	1,000,000	5	.19¼	.18¼	2,400
Silver King	Park City	150,000	20	80.00	80.00	10
Star Con.	Tintic	500,000	1	.32	.26	33,000
Swansea.	Tintic	100,000	5			
So. Swansea.	Tintic	300,000	1			
Showers Con.	Tintic	400,000	5			
Sunshine.	Mercur	250,000	10			
Tetro.	Tintic	500,000	5			
Tesora	Tintic	400,000	1			
U. Sunbeam.	Tintic	150,000	1			
Uncle Sam.	Tintic	500,000	1	.65	.46¼	29,475
West Mng. Glory	Tintic	500,000	.10	.04	.03¾	10,500
Victor	Tintic	500,000	1	.38¼	.28½	4,100
Yankee Con.	Tintic	500,000	1	2.85	1.91	3,960
Ben Butler.	Bingham	500,000	1	.14	.12¼	18,300
Boss Tweed.	Tintic	250,000	1	.50		100
California.	Park City	300,000	1	.50	.30	72,600
Century	Park Valley	150,000	1	.25	.17	24,700

*By our Special Correspondent. Total number of shares sold, 382,755

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Name of Company.	par val	Jan. 20. H.	Jan. 20. L.	Jan. 21. H.	Jan. 21. L.	Jan. 22. H.	Jan. 22. L.	Jan. 23. H.	Jan. 23. L.	Jan. 24. H.	Jan. 24. L.	Jan. 25. H.	Jan. 25. L.	Sales
Acacia	$1	.11¼	.11	.12	.11½	.12	.11½	.11⅞	.11⅛	.11⅝	.11⅜	.11¾	.11	7,000
Alamo	1	.13⅜	.12⅞	.13¼	.12⅞	.13¼	.12⅞	.13⅜	.12⅞	.13¼	.12⅞	.13¾	.12⅞	1,000
Am. Con	1	.02⅞	.02½	.02⅞	.02⅝	.02⅞	.02½	.02⅞	.02½	.02⅞	.02½	.02½	.02	2,000
Anaconda	1	.30	.27	.30	.25½	.29	.26½	.27	.....	.30	.25½	.27½	.26½	2,500
Anchor	1	.02	.....	.....	.....	.....	.....	.01⅝	.....	.01⅝	.....	.01⅜	.....	.....
Antelope	1	.01⅛	.....	.01⅜	.....	.01⅜	.....	.01⅜	.....	.01⅞	.....	.01⅛	.....	4,000
Aola	1	.03⅛	.03	.03¼	.03⅛	.03⅛	.03	.03⅛	.03	.03⅛	.03	.03⅛	.03	17,000
Argentum Jr	1	.05	.....	.07	.05½	.06	.05½	.06	.05½	.06	.05½	.....	.....	24,000
Banner	1	.01¼	.01	.01¼	.01	.01¼	.01	.....	.....	.01¼	.01	.01⅛	.01	.....
Battle Mt. C	1	.15	.14⅜	.15	.14¾	.15	.14⅜	.15	.....	.15	.....	.15	.....	4,000
Black Bell	1	.08	.06	.06	.....	.08	.06	.08	.06	.08	.06⅛	.07¾	.07	.....
Blue Bell	1	.09½	.07⅜	.08½	.08	.08⅜	.08⅛	.09	.08¾	.09	.08½	.09	.08⅛	2,000
Buckhorn	1	.02¼	.02	.02¼	.02	.02¼	.02	.02¼	.02	.02¼	.02	.02⅜	.02	.....
But'fly Ter	1	.18	.17	.18	.15	.18	.15	.18	.....	.18	.....	.17	.15	.....
Cadillac	1	.01¼	.....	.02	.....	.02	.....	.02	.....	.01¾	.....	.....	.....	.....
Cent'l Con	1	.06¾	.....	.07¼	.06¾	.07⅛	.06½	.07⅜	.06½	.07	.06½	.06½	.....	1,000
Champion	1	.02¼	.....	.03⅛	.02½	.02½	.....	.03	.02½	.02½	.....	.....	.....	.....
Chicolo	1	.01⅛	.01	.01⅛	.....	.01⅛	.01	.01¼	.01	.01¼	.01	.01¼	.....	2,000
C. K. & N	1	.02⅛	.02¾	.02¼	.02¾	.03⅛	.03	.03⅛	.02⅞	.03⅛	.03	.03⅛	.03	22,000
C. C. Colum	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
C. C. G. Ext	1	.06	.05½	.06	.05	.06	.05¼	.06¼	.06	.06	.05	.06	.....	9,700
C. C. & Mn	1	.04¼	.04	.04¼	.04	.04¼	.04	.04¼	.04	.04⅛	.04	.04⅛	.04	11,000
Cr'de & C. C	1	.04	.....	.04	.....	.08	.04⅛	.06	.04⅛	.04	.....	.....	.....	.....
C. C. Con	1	.08½	.08⅜	.08⅜	.08⅜	.09	.08⅝	.09⅛	.08¾	.09	.08⅛	.08¾	.08⅛	18,500
Dante	1	.05	.04	.04⅜	.04⅜	.04⅝	.04¼	.04¼	.04	.04⅛	.04	.04¼	.04	4,000
Dr. Jack Pot	1	.40⅜	.40	.39	.....	.41⅜	.40⅞	.41⅜	.40½	.41¾	.41	.41⅜	.40⅞	24,800
Eclipse	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Elkton, Con	1	1.26	1.25	1.28¼	1.27	1.29	1.28½	1.30½	1.29½	1.30	1.29	1.30	1.29	41,038
El Paso, G	1	.54½	.54	.52¾	.52⅜	.53⅞	.53⅜	.56⅞	.56⅜	.56⅜	.55½	.55½	.....	90,522
Fanny Rawlings	1	.13	.10	.13	.....	.13	.11½	.10	.....	.10	.....	.15	.10	1,500
Findley	1	.12	.11¾	.11⅜	.11¼	.11¼	.11	.11½	.11¼	.11½	.11	.11¼	.11	20,000
Gold Dollar	1	.07¾	.06⅝	.07¾	.07¼	.07⅞	.07¼	.07¼	.07	.07	.06¾	.07	.06¾	18,000
Gold Cycle	1	.60	.55	.66	.65	.68	.64½	.67¼	.66	.66	.....	.67½	.65½	8,500
Gold Fleece	1	.60	.59	.59½	.59	.60	.58	.60	.57¾	.59½	.59	.59⅝	.57½	6,350
Gold Sov'n	1	.03¼	.02¾	.03¼	.03	.03¼	.03	.03¼	.03	.03½	.03	.03	.....	15,000
Hayden, G	½	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ingham, Con	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ironclad	1	.05	.....	.05	.....	.05	.....	.05	.....	.05	.....	.05	.....	.....
Isabella	1	.27¾	.27	.28	.27½	.28	.27¾	.31	.30	.31⅜	.31	.30½	.....	29,250
Jack Pot	1	.35	.32½	.35	.31	.36	.31	.34	.32	.33½	.29	.36	.....	.....
Josephine	1	.01¼	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,000
Key West	1	.01¼	.....	.01¼	.....	.01¼	.....	.01¼	.....	.02	.....	.....	.....	.....
Lexington	1	.06	.....	.05½	.05⅜	.06	.05⅞	.05¼	.....	.06⅜	.06⅜	.06⅜	.06⅜	18,000
Magnet, R	1	.02	.01½	.02	.01½	.02	.01½	.02	.01⅛	.02	.01½	.02	.01½	4,000
Margaret	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Margery	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Midway	1	.03⅝	.03½	.03¾	.03¼	.03⅝	.03¼	.03⅝	.03¼	.03¾	.03¼	.03½	.03¼	4,000
M. J. T	1	.01¼	.01	.01¼	.01	.01¼	.01	.01⅜	.....	.01¼	.01	.01⅜	.....	5,000
Mobile	1	.02¼	.02	.02⅜	.02	.02¼	.02	.02½	.02¼	.03¼	.02⅞	.03⅜	.02⅞	28,000
Moll Dwyer	1	.02¼	.02	.02¼	.02	.02	.....	.02¼	.....	.02¼	.02	.02¼	.01½	.....
Mol. Gibson	1	.15½	.14½	.15¼	.14⅜	.15½	.14½	.15½	.14⅜	.15¼	.14½	.15	.14½	1,900
Monarch	1	.02⅛	.02	.02	.....	.02¼	.02	.02½	.....	.02½	.02	.02½	.02	.....
Montreal	1	.02¼	.....	.02¼	.....	.02¼	.....	.02¼	.....	.02¼	.....	.02¼	.....	.....
Moon A'c'r	1	.20	.18½	.20	.....	.19½	.....	.20	.18	.20	.19¾	.20	.19¾	.....
Morn'g Star	1	.03	.02¾	.03	.02	.03	.02	.03	.02¾	.02¾	.02¾	.02⅝	.02⅜	15,000
National	1	.02¼	.02	.02¼	.02	.02¾	.02	.02½	.02	.02½	.02	.02½	.02	12,000
Nellie, V	1	.03¾	.03⅝	.03¾	.03⅝	.03⅝	.03½	.03¾	.03⅜	.03¾	.03¼	.03¾	.03⅜	3,000
New Haven	1	.04⅛	.03¼	.04	.03½	.04	.03⅜	.04	.03⅞	.04	.....	.04	.03½	1,000
Olive Branch	1	.02	.....	.02¼	.01⅞	.02	.01⅝	.02½	.02	.02½	.01⅝	.....	.....	.....
Oriole	1	.01⅜	.01¼	.01½	.01¼	.01⅝	.01¼	.01⅝	.01¼	.01¾	.....	.02	.01	.....
Pharmacist	1	.....	.....	.05¾	.05⅛	.05¼	.04¾	.05	.04⅞	.05	.04¾	.05	.04¾	5,000
Pilgrim	1	.05⅜	.04½	.04⅝	.....	.05¾	.04⅝	.....	.....	.04½	.....	.04	.....	1,500
Pinnacle	1	.07	.....	.07	.06¾	.06¾	.05	.07	.05	.06¾	.05½	.07	.06	.....
Pointer	1	.03¼	.03	.03¼	.03	.03⅜	.03	.03¼	.03	.03¼	.03	.03⅛	.03	4,000
Portland	1	2.40	2.33	2.35	.....	2.40	.....	2.50	.....	2.60	2.45	2.65	2.50	5,400
Prince Alb	1	.037⅛	.03⅝	.039¼	.03½	.....	.....	.037⅛	.03½	.037⅛	.03½	.037⅛	.03½	2,000
Princess	1	.02⅜	.02	.02¼	.....	.02½	.....	.02½	.02	.02¼	.02	.02¼	.02	.....
Progress	1	.03⅜	.03	.03¼	.....	.03½	.03¼	.03⅝	.03	.04	.....	.03¾	.....	4,000
Pythias	1	.02⅛	.02	.02⅜	.02	.02⅛	.02	.02¼	.02	.02¼	.01¾	.02⅛	.01⅞	2,000
Republic	1	.03¼	.03	.03⅝	.03	.03¼	.03	.03¼	.03	.03½	.03	.03⅛	.02⅞	6 000
Rob. Burns	1	.....	.....	.02¾	.01½	.02½	.02⅛	.02½	.....	.02½	.01½	.02½	.01½	.....
Rose Maud	1	.05	.01¾	.05	.04¾	.05	.04⅝	.04¾	.04½	.04¾	.04	.04⅝	.04½	2,000
Rose Nicol	1	.04⅜	.04	.04⅞	.04	.05	.04	.04⅝	.04	.04¾	.04	.04¾	.04	1,000
Silver Gold	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Uncle Sam	1	.01⅝	.....	.02¼	.01⅝	.02	.01⅝	.01⅝	.....	.02	.01¾	.02	.01¾	6,000
Vindicator	1	1.20	1.14	1.16	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,100
Va. M	1	.....	.....	.....	.....	.....	.....	.04	.....	.04	.....	.05½	.02½	.....
Work	1	.09	.08½	.09	.08¼	.09	.....	.09½	.08¾	.....	.08½	.09½	.08⅞	,5
														0

Total sales 505,460 shares.

Colorado Springs (*By Telegraph.*)

Name of Company.	par val	Jan. 23. H.	Jan. 23. L.	Jan. 24. H.	Jan. 24. L.	Jan. 25. H.	Jan. 25. L.	Jan. 27. H.	Jan. 27. L.	Jan. 28. H.	Jan. 28. L.	Jan. 29. H.	Jan. 29. L.
Acacia	$1	.11⅞	.11¼	.11⅝	.11¾	.11¾	.11	.11⅞	.11¼	.12	.11⅛	.11⅜	.11⅜
Alamo	1	.13¾	.12⅞	.13¼	.12⅞	.13¼	.12½	.13¾	.12⅝	.13¼	.12⅞	.13	.12¾
Anaconda	1	.30	.27	.30	.25½	.27½	.26⅛	.30	.27⅛	.30	.27¼	.30	.26¾
Argentum	1	.06	.05¾	.06	.05½	.06	.05⅞	.06⅛	.05½	.06½	.05½	.06¼	.05½
Battle Mt	1	.15	.14	.15	.14¾	.15	.14¾	.15	.14	.14¾	.14	.15	.14
Butterfly Ter	1	.18	.15	.18	.15	.17	.15	.17	.15	.18	.15	.18	.16⅞
Cripple Creek Con	1	.09¼	.08¾	.09	.08¾	.08¾	.08¼	.08¾	.08⅛	.08¾	.08⅛	.09	.08⅝
Dr. Jack Pot	1	.41⅜	.40½	.41⅜	.41	.41⅛	.40⅞	.41⅛	.40⅝	.41½	.40¾	.41⅜	.40⅜
El Paso	1	.56⅞	.56½	.56¾	.55½	.55⅞	.55½	.56¼	.55¾	.57	.56¾	.56½	.56¼
Elkton, Con	1	1.30¼	1.29⅝	1.30	1.29	1.30	1.29	1.35	1.33	1.39	1.33½	1.39	1.38¾
Fanny Rawlings	1	.13	.10	.13	.10	.15	.10	.13	.10	.13	.10	.13	.10
Findley	1	.11¾	.11	.11½	.11	.11¾	.11	.11¼	.11	.11¾	.11	.11⅝	.11¾
Gold Dollar	1	.21	.20	.22	.20	.22	.20	.22	.19½	.21	.20	.20⅝	.19½
Gold King	1	.55	.30	.55	.30	.50	.37	.50	.30	.50	.38	.50	.30
Golden Cycle	1	.67¼	.66	.68	.66	.67½	.65½	.68	.67½	.70	.67	.68	.66
Golden Fleece	1	.60	.57¾	.59¾	.59	.60	.58½	.59	.56	.58	.57	.56¾	.55
Hart	1	.06	.04	.06	.04	.06	.04	.06	.04	.05	.04	.06	.04
Ingham, Con	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Isabella	1	.31	.30	.31⅜	.31	.31½	.30½	.32½	.31¾	.33	.31¾	.32½	.31¾
Jack Pot	1	.34	.32	.33½	.29	.36	.30	.36	.32	.35	.32	.37	.32
Keystone	1	.08	.07	.08	.06⅞	.08	.06¾	.08	.07	.07⅞	.06⅝	.08	.06¾
Last Dollar	1	.60	.40	.60	.40	.60	.40	.60	.40	.61	.43	.60	.41
Lexington	1	.06¾	.06¼	.06⅝	.06⅜	.06½	.06⅜	.10	.06¼	.07¼	.07	.08⅛	.08
Mollie Gibson	1	.15½	.14½	.15¼	.14½	.15	.14⅜	.15	.14	.15	.14	.15	.14
Moon Anchor	1	.20	.18	.20	.19¾	.20	.19¾	.20	.19¾	.20	.19¾	.20	.19½
National	1	.02⅛	.02	.02⅛	.02	.02⅛	.02	.02⅛	.02	.02⅛	.01⅞	.02⅛	.01¾
New Haven	1	.04	.03¾	.04	.03⅝	.04	.03¾	.04	.03	.04	.03⅞	.04	.03⅝
Pharmacist	1	.05	.04¾	.05	.04¾	.05	.04¾	.05	.04¾	.05	.04⅞	.05¼	.04⅞
Pinnacle	1	.07	.05½	.06¾	.05½	.07	.06½	.07	.06¾	.08	.07	.08⅛	.07
Portland	1	2.60	2.50	2.60	2.45	2.60	2.50	2.60	2.55	2.65	2.55	2.60	2.50
Vindicator, Con	1	1.16	1.10	1.16	1.10	1.16	1.10	1.23	1.16	1.25	1.15	1.20	1.18½
Work	1	.08½	.08⅜	.08⅛	.08	.08½	.08	.08½	.08	.08	.07¾	.08½	.07¾

MONTREAL, CANADA. Jan. 27.

Name of Company.	par val	H.	L.	Sales	Nome of Company.	par val	H.	L.	Sales
Big Three	$1	.01¼	.....	.....	Montreal-London	$0.24	.02½	.....	.....
California	1	.04¾	.04	.....	Noble Five	1	.....	.....	.....
Can. Gold Fields	0.10	.....	.....	.....	Novelty	1	.....	.....	.....
Deer Trail Con	1	.03½	.02¾	.....	North Star	.....	.27	.26	.....
Evening Star	1	.04	.02	.....	Payne	1	.32	.30	4,000
Golden Star	1	.04¼	.03	.....	Rambler-Cariboo	1	.....	.....	.....
Gold Hills Dev	1	.01½	.....	.....	Republic Con	1	.....	.....	.....
Knob Hill	1	.....	.....	.....	Slocan-Sovereign	1	.02¾	.....	.....
Monte Christo	1	.02	.....	.....	Virtue	1	.20	.....	4,000
Montreal, G. F	1	.02½	.....	.....	War Eagle	1	.....	.....	.....

LONDON. Jan. 17.

Name and Country of Company	Authorized Capital.	Par value.	Last dividend. Amt.	Last dividend. Date	Quotations. Buyers.	Quotations. Sellers.
	£	£. s. d.	s. d.		£. s. d.	£. s. d.
Alasks-Treadwell, g., Alaska	1,000,000	5 0 0	1 6	Jan., 1902	4 0 0	4 5 0
Anaconda, c. s., Montana	6,000,000	5 0 0	8 2	Oct., 1901	6 5 0	6 7 6
Copiapo, c., Chile	200,000	2 0 0	2 6	Dec., 1901	2 17 6	2 2 5
De Lamar, g. s., Idaho	400,000	1 0 0	2 0	Dec., 1901	1 0 0	1 5 0
El Oro, g., Mexico	1,000,000	1 0 0	1 3	July, 1901	1 6 3	1 8 9
Enterprise, g., British Col	200,000	1 0 0			13 9	16 3
Frontino & Bolivia, g., Columbia	140,000	1 0 0	3 0	July, 1901	1 2 6	1 5 0
Hall, Mg. & Sm., c. s., British Col.	325,000	1 0 0			7 6	8 6
Le Roi, g., British Col	1,000,000	5 0 0	5 0	Nov., 1899	4 0 0	4 2 6
Le Roi No. 2, g., British Col	120,000	5 0 0	5 0	July, 1901	2 17 6	3 0 0
Montana, g. s., Montana	660,000	1 0 0	6	April, 1899	4 6	5 0
Mountain Copper, California	1,250,000	5 0 0	5 0	Oct., 1901	3 15 0	4 0 0
Stratton's Independence, Colorado	1,100,000	1 0 0	1 0	Oct., 1901	10 0	12 6
St. John del Rev., g., Brazil	600,000	1 0 0	1 0	June, 1901	18 0	19 0
Utah Con., g., High. Boy), Utah	300,000	1 0 0	5 0	May, 1901	4 10 0	5 0 0
Ymir, g., British Col	200,000	1 0 0	1 0	Nov., 1901	2 1 3	2 3 9
European:						
Linares, l., Spain	45,000	3 0 0	7 0	March, 1901	2 10 0	3 10 0
Mason & Barry, c., sul., Port'g'l	420,000	1 0 0	12 6	May, 1901	3 2 6	3 7 6
Rio Tinto, c., Spain	1,625,000	5 0 0	£1 15s	Nov., 1901	40 7 6	40 12 6
Rio Tinto, pref., Spain	1,625,000	2 0 0	2s 6d	Nov., 1901	5 17 6	6 2 6
Tharsis, c., Spain	1,250,000		12 0	May, 1900	5 17 6	6 2 6
Australia and New Zealand:		1 0 0	1 6	Jan., 1900	2 6 3	2 7 6
Assoc. Gold Mines, W. Australia	500,000	8 0	1 0	Nov., 1901	1 13 0	1 14 0
Br'ken Hill Pr'p., s., N. S. Wales	384,000	2 0	6	Jan., 1902	1 0 9	1 1 3
Great Bo'd'r Pr'p., W. Australia	175,000	1 0 0	7 6	Oct., 1900	3 1 3	3 3 6
Hannan's B'n'hill, g., W. Australia	140,000	5 0 0	3 0	Feb., 1902	8 0 0	8 2 6
Ivanhoe Gold C'p., W. Australia	1,00,000	1 0 0	rts.	Oct., 1899	3 18 9	4 1 3
Kalgurlie, g., W. Australia	120,000	1 0 0	5 0	Oct., 1901	6 5 0	6 7 6
Lake View Cons., g., W. Australia	250,000	3 0 0	4 0	Jan., 1902	3 13 9	3 16 3
Mt. Lyell M. E. R. I., c., Tasmania	900,000	1 0 0	6	Dec., 1901	4 2 6	4 5 0
Mt. Morgan, g., Queensland	1,000,000	1 0 0	2 6	Dec., 1901	5 11 4	5 13 9
Waihi, g., New Zealand	330,000					
Indian:		10 0	7 8	Jan., 1902	5 8 9	5 11 3
Champion Reef, g., Colar Fields	234,169	10 0	3 2	Nov., 1901	5 17 6	6 0 0
Mysore Gold, Colar Fields	265,000	10 0	1 6	Nov., 1901	1 18 9	2 1 3
Nundydroog, g., Colar Fields	242,000	10 0	1 6	Dec., 1901	2 6 3	2 8 9
Ooregum, g., Colar Fields	290,000	10 0	1 6	Dec., 1901	2 15 0	2 17 6
Ooregum, pref., g., Colar Fields	240,000					
African:		1 0 0	rts.	May, 1899	4 8 9	4 11 3
British S. Africa, ch'd S. Africa	5,000,000	2 0 0	8 0	Jan., 1902	4 5 0	4 10 0
*Cape Copper, S. Africa	600,000	2 0 0	8 0	Jan., 1902	4 5 0	4 10 0
Cape Copper, pref., S. Africa	150,000	4 0 0	3 0	Aug., 1899	6 16 3	6 18 9
City & Sub'n (New), g., Transvaal	1,360,000	1 0 0	18 0	Nov., 1899	16 10 0	17 0 0
Crown Reef, g., Transvaal	120,000	5 0 0	£1	Sept., 1901	43 5 0	43 7 6
De Beers Con., d., Cape Colony	3,950,000	1 0 0	3 0	Aug., 1899	22 10 0	23 0 0
Ferreria g., Transvaal	90,000	1 0 0	10 0	Aug., 1899	7 3 9	7 6 3
Geldenhuis Est., g., Transvaal	200,000	1 0 0	10 0	Aug., 1899	8 15 0	9 0 0
Henry Nourse, g., Transvaal	125,000	5 0 0	6 0	Dec., 1900	25 12 6	25 17 6
Jagersfontein, d., Orange F. S	1,000,000	1 0 0	2 0	Nov., 1899	3 1 3	3 3 9
Joh'n'b'g Con. Invet., S. Africa	2,750,000	1 0 0	5 0	Aug., 1899	6 12 6	6 17 6
Jubilee, g., Transvaal	50,000	1 0 0	3 0	Sept. 1899	4 18 9	5 1 3
Langlaagte Est., g., Transvaal	470,000	1 0 0	0 6	Aug., 1899	4 16 3	4 18 9
May Con., g., Transvaal	280,000	1 0 0	3 0	Feb., 1902	5 17 6	6 2 6
Meyer & Charlton, g., Transvaal	100,000	2 0 0	4 0	Dec., 1901	3 12 6	3 17 6
Namaqua, c., Cape Colony	200,000	1 0 0	6 0	Aug., 1899	4 17 6	5 0 0
Primrose (New), g., Transvaal	300,000	5 0	15 0	Aug., 1899	11 11 3	11 13 9
Rand Mines, g., S. Africa	1,795,956	5 0 0	8 0	Aug., 1899	10 11 2	10 13 9
Robinson, g., Transvaal	2,750,000	1 0 0	0 6	July, 1899	1 3 9	1 5 0
Sheba, g., Transvaal	1,100,000	5 0 0	4 0	July, 1899	8 0 0	8 2 6
Sim. & Jack Prp., g., Transvaal	5,000,000	4 0 0	2 0	Feb., 1899	6 2 6	6 5 0

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver. x-dividend.

PARIS. Jan. 9.

Name of Company.	Country.	Product.	Capital Stock.	Par value.	Latest divs.	Prices. Opening.	Prices. Closing.
			Francs.	Fr.	Fr.	Fr.	Fr.
Acieries de Creusot	France	Steel mfrs	27,000,000	2,000	85.00	1,676.00	1,670.00
" " Firminy	"	" "	3,000,000	500	200.00	2,380.00	2,400.00
" " Huta-Bank	Russia	Iron and Steel		500	.....	3,160.00	3,150.00
" " la Marine	France	Steel mfrs	20,000,000	500	65.00	1,333.00	1,350.00
Anzin	"	Coal			320.00	5,430.00	5,475.00
Boleo	Lower Cal	Copper		500	176.00	1,840.00	1,775.00
Briansk	Russia	Coal and Iron		500	.....	389.00	407.00
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	36.00	36.00
Courrieres	France	Coal	600,000	300	90.00	2,315.00	2,335.00
Dombrowa	Russia	"		500	75.00	987.00	990.00
Dourges	France	"	12,000,000	500	1,000	24,700.00	24,700.00
Dynamite Centrale	"	Explosives		500	19.00	640.00	730.00
Escombrera-Bleyberg	Spain	Lead		500	50.00	724.00	715.00
Fraser River	Brit. Col'mb	Gold	250,000	25	.....	6.50	5.50
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	123.00	132.00
Laurium	Greece	Zinc and Lead	16,300,000	500	25.00	345.00	340.00
Malfidano	Italy	Zinc	12,500,000	500	12.50	411.00	414.00
Metaux, Cie. Fran. de	France	Metal dealers	25,000,000	500	22.50	349.00	370.00
Mokta-el-Hadid	Algeria	Iron	18,312,500	500	35.00	840.00	845.00
Napthe Baku	Russia	Petroleum				319.00	312.00
Napthe Nobel	"	"				450.00	450.00
" " parts	"	"				9,000.00	9,000.00
Nickel	N. Caled'nia	Nickel	10,000,000	250	20.00	485.00	500.00
Penarroya	Spain	Coal, etc		500	55.00	1,080.00	1,090.00
Rebecca	Colo'do, U. S.	Gold	5,000,000	25	.....	1.25	1.25
Salines de l'Est	France	Salt		500	6.00	280.00	270.00
Salines du Midi	"	"		500	40.00	835.00	860.00
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	580.00	563.00

TORONTO, ONT.

Name of Company.	par val	Jan. 21. H.	Jan. 21. L.	Jan. 22. H.	Jan. 22. L.	Jan. 23. H.	Jan. 23. L.	Jan. 24. H.	Jan. 24. L.	Jan. 25. H.	Jan. 25. L.	Jan. 27. H.	Jan. 27. L.	Sales
Ontario:														
Golden Star	1	.03½	.02¾	.03½	.02¾	.03½	.02½	.03½	.02½	.03½	.02½	.03½	.02½	.....
British Columbia:														
Cariboo McK	1	.27	.24½	26	.25	.26½	.25	.26¾	.24	.28	.25	.31	.30	4,500
Center Star	1	.40	.37	.42½	.40½	.46	.42	.45	.43	.46	.44	.45	.43	5,000
Crows, N. C	25	80.00	77.50	82.00	76.00	84.00	78.00	85.00	78.00	86.00	80.00	86.00	70.00	.....
Deer Trail	1	.03	.....	.03	.....	.03	.....	.03	.....	.03	.....	.03	.....	.....
Fairview	1	.04¼	.03½	.05	.03	.04½	.03¾	.04¼	.03½	.04¾	.03¾	.04¼	.03½	1,000
Morrison	1	.07	.04	.07	.04	.08	.04	.07	.04	.08	.04	.....	.....	.....
Mt. Lion	1	.31	.27½	.30	.25	.30	.25	.30	.22	.30	.25	.30	.25	.....
North Star	1	.26	.23	.26	.24½	.26	.24	.26	.24	.26	.24	.26	.24	500
Payne	1	.30	.26	.31	.29	.35	.30	.31	.28	.31	.29	.31½	.30	500
Rambler	1	.85	.77½	.90	.80	.95	.80	1.00	.86	.95	.81	.88	.74	.....
Republic	1	.04	.03¾	.04¼	.03½	.04¼	.03½	.04¼	.03½	.04¼	.03¾	.04¼	.03¼	.....
Virtue	1	.....	.....	.26	.22	.28	.23	.27	.22	.....	.....	.....	.....	.....
War Eagle Cons	1	.10	.08½	.12	.09	.13	.10½	.12½	.11½	.14	.11¾	.13	.12½	5,000
Winnipeg	1	.07	.04½	.06	.04¼	.07	.04½	.07	.04¼	.07	.04½	.07	.04	.....
Wonderful	1	.03	.....	.03	.....	.03	.....	.03	.....

CHEMICALS, MINERALS, RARE EARTHS, ETC. CURRENT WHOLESALE PRICES.

	Cust. Meas.	Price.
Abrasives—		
Carborundum, f.o.b. Niagara Falls, Powd., F. FF. FFF..	lb.	$0.08
Grains	"	.10
Corundum, N. C	"	.07@.10
Chester, Mass	"	.04½@.05
Barry's Bay, Ont	"	.07¼@.09½
Crushed Steel, f. o. b. Pittsburg	"	.05½
Emery, Turkish flour, in kegs	"	.03½
Grains, in kegs	"	.05@.05½
Naxos flour, in kegs	"	.03½
Grains, in kegs	"	.05@.05½
Chester flour, in kegs	"	.03½
Grains, in kegs	"	.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"	.01½
Grains, in kegs	"	.02½
Crude, ex-ship N. Y.: Abbott (Turkey)	lg. ton	26.50@30.00
Kuluk (Turkey)	"	22.00@24.00
Naxos (Greek) h. gr	"	26.00
Garnet, as per quality	sh. ton	25.00@35.00
Pumice Stone, Am. powd	lb.	.01½@.02
Italian, powdered	"	.01¼
Lump, per quality	"	.04@.40
Rottenstone, ground	"	02½@.04½
Lump, per quality	"	.03@.20
Rouge, per quality	"	.10@.30
Steel Emery, f.o.b. Pittsburg	"	.07
Acids—		
Boracic, crystals	"	.10¾@.11
Powdered	"	.11¼@.11½
Carbonic, liquid gas	"	.12½
Chromic, crude	"	.20
Hydrofluoric, 30%	"	.03
48%	"	.05
Best	"	.25
Sulphurous, liquid anhy	"	.08
Alcohol—Grain	gal.	2.55
Refined wood, 95@97%	"	.60@.65
Purified	"	1.20@1.50
Alum—Lump	100 lbs.	1.75
Ground	"	1.80
Powdered	"	3.00
Chrome, com'l	"	2.75@3.00
Aluminum—		
Nitrate	lb.	1.50
Oxide, com'l, common	"	.06½
Best	"	.20
Pure	"	.80
Hydrated	100 lbs.	2.60
Sulphate, pure	"	1.50@2.00
Com'l	"	1.15@1.25
Ammonia—		
Aqua, 16°	lb.	.03
18°	"	.03¼
20°	"	.03¾
26°	"	.05½
Ammonium—		
Carbonate, lump	"	.08¼@.08½
Powdered	"	.09@.09¼
Muriate, grain	"	.05¾
Lump	"	.08⅝
Nitrate, white, pure (99%)	"	.12
Phosphate, com'l	"	.09
Chem., pure	"	.60
Antimony—Glass	"	.30@.40
Needle, lump	"	.05½@.06
Powdered, ordinary	"	.05¾
Best	"	.08½
Oxide, com'l white, 95%	"	.09½
Com'l white, 99%	"	.12
Com'l gray	"	.07
Sulphuret com'l	"	.16
Arsenic—White	"	.03½
Red	"	.06 @.07¼
Asphaltum—		
Venturn, Cal	sh. ton	32.00
Cuban	lb.	.01½@.03½
Egyptian, crude	"	.05½@.06
Trinidad, refined	sh. ton	35.00
San Valentino (Italian)	lg. ton	16.00
Seyssel (French), mastic	sh. ton	21.00
Gilsonite, Utah, ordinary	lb.	.03
Select	"	.03¾
Barium—		
Carb. Lump, 80@90%	sh. ton	25.00@27.50
92@98%	"	26.00@29.00
Powdered, 80@90%	lb.	.01¾@.02
Chloride, com'l	100 lbs.	1.67½@1.76
Chem. pure cryst	lb.	05
Nitrate, powdered	"	.05⅛

	Cust. Meas.	Price
Barium—		
Oxide, Am. hyd. cryst	lb.	$0.02¾
Sulphate (Blanc Fixe)	"	.02
Barytes—		
Am. Crude, No. 1	sh. ton	9.00
Crude, No. 2	"	8.00
Crude, No. 3	"	7.75
German, gray	"	14 50
Snow white	"	17.00
Bauxite—Ga. or Ala. mines:		
First grade	lg. ton	5.50
Second grade	"	4.75
Bismuth—Subnitrate	lb.	1.40
Subcarbonate	"	1.65
Bitumen—"B"	"	.03½
"A"	"	.05
Bone Ash	"	.02¼@.02½
Borax	"	.07¼@.07½
Bromine	"	.40
Cadmium—Metallic	"	1.40
Sulphate	100 lbs.	2.00@2.50
Calcium—Acetate, gray	"	1.25
" brown	"	.85
Carbide, ton lots f.o.b. Niagara Falls, N. Y.. or Jersey City, N. J	sh. ton	75.00
Carbonate, ppt	lb.	.05
Chloride, com'l	100 lbs.	.75@.80
Best	"	1.00
Cement—		
Portland, Am., 400 lbs	bbl.	1.70@2.00
Foreign	"	1.65@2.25
"Rosendale," 300 lbs	"	.95
Slag cement, imported	"	1.65
Ceresine—		
Orange and Yellow	lb.	.12
White	"	.13½
Chalk—Lump, bulk	sh. ton	2.45
Ppt. per quality	lb.	.03¾@.06
Chlorine—Liquid	"	.30
Water	"	.10
Chrome Ore—		
(50% ch.) ex-ship N. Y	lg. ton	24.75
Sand. f.o.b, Baltimore	"	33.00
Bricks. f.o.b. Pittsburg	M	175.00
Clay, China—Am. com., ex-dock, N. Y	lg. ton	8.00
Am. best, ex-dock, N. Y	"	9.00
English, common	"	12.00
Best grade	"	17.00
Fire Clay, ordinary	sh. ton	4.25
Best	"	6.00
Slip Clay	"	5.00
Coal Tar Pitch	gal.	.08
Cobalt—Carbonate	lb.	1.75
Nitrate	"	1.50
Oxide—Black	"	2.28@2.30
Gray	"	2.28@2.40
Smalt, blue ordinary	"	.06
Best	"	.20
Copperas	100 lbs.	.30@.35
Copper—Carbonate	lb.	.18
Chloride	"	.25
Nitrate, crystals	"	.35
Oxide, com'l	"	.19
Cryolite	"	.06½
Explosives—		
Blasting powder, A	25 lb. keg	2.65
Blasting powder, B	"	1.40
"Rackarock," A	lb.	.25
"Rackarock," B	"	.18
Judson R.R. powder	"	.10
Dynamite (20% nitro-glycerine)	"	.13
(30% nitro-glycerine)	"	.14
(40% nitro-glycerine	"	.15
(50% nitro-glycerine)	"	.16½
(60% nitro-glycerine)	"	.18
(75% nitro-glycerine)	"	.21
Glycerine for nitro (32 2-10° Be.)		.12⅞@.13
Feldspar—Ground	sh. ton	8.00@9.00
Flint Pebbles—Danish, Best	lg. ton	14.75
French, Best	"	11.75
Fluorspar—		
Am. lump, 1st grade	sh. ton	$14.40
2d grade	"	13.90
Gravel and crushed, 1st gr	"	13.40
2d grade	"	12.40
Ground, 1st grade	"	17.90
2d grade	"	16.50
Foreign, lump	"	8.00@12.00
Ground	"	11.50@14.00
Fuller's Earth—Lump	100 lbs.	.75
Powdered	"	.85

	Cust. Meas.	Price
Graphite—Am. f.o.b. Providence, R. I., lump	sh. ton	8.00
Pulverized	"	30.00
German, som. pulv	lb	.01¼@.01½
Best pulverized	"	.01½@.02
Ceylon, common pulv	"	.02¾@.03½
Best pulverized	"	.04@.08
Italian, pulv	"	.01¼
Gypsum—Ground	sh. ton	8.00@8.50
Fertilizer	"	7.00
Rock	lg. ton	4.00
English and French	"	14.00@16.00
Infusiorial Earth—Ground.		
American, best	"	20.00
French	"	37.50
German	"	40.00
Iodine—Crude	100 lbs.	2.45
Iron—Muriate	lb.	.05
Nitrate, com'l	"	.01¼
True	"	.04
Oxide, pure copperas col	"	.05@.10
Purple-brown	"	.02
Venetian red	"	.01@.01½
Scale	"	.01@03
Kaolin—(See Clay. China.)		
Kryolith—(See Cryolite.)		
Lead—Acetate, white	"	.07¾@.08
Brown	"	.06
Nitrate, com'l	"	.06½
" gran	"	.08¼
Lime—Com., abt. 250 lbs	bbl.	.80
Finishing	"	.90
Magnesite—Greece.		
Crude (95%)	lg. ton	6.50@7.00
Calcined	sh. ton	14.00@15.00
Bricks	M	170.00
Am. Bricks, f.o.b. Pittsburg	"	175.00
Magnesium—		
Carbonate, light, fine pd	lb.	.04½
Bricks	"	.06@.07
Chloride, com'l	"	.01¾
Fused	"	.20
Nitrate	"	.60
Sulphate	100 lbs.	.75@.95
Manganese—Powdered, 70@75% binoxide	lb.	.01¼@.01½
Crude, pow'd. 75@85% binoxide	"	.01½@.02¼
85@90% binoxide	"	.02¼@.03¼
90@95% binoxide	"	.03¼@.05½
Carbonate	"	.16@.20
Chloride	"	.04
Ore, 50%, Foreign	unit	.22@.23
Domestic	"	.30
Marble—Flour	sh. ton	6.00@7.00
Mercury—Bichloride	lb.	.77
Mica—N. Y. gr'nd, coarse	"	.03@.04
Fine	"	.04@.05
Sheets, N. C., 2x4 in	"	.30
3x3 in	"	.80
3x4 in	"	1.50
4x4 in	"	2.00
6x6 in	"	3.00
Mineral Wool—		
Slag, ordinary	sh. ton	19.00
Selected	"	25.00
Rock, ordinary	"	32.00
Selected	"	40.00
Nickel—Oxide, No. 1	lb.	1.00
No. 2	"	.60
Sulphate	"	.20@.21
Oils—Black, reduced 29 gr.:		
25@30, cold test	gal.	.09¾@.10¼
15, cold test	"	.10¾@.11¼
Zero	"	.11¾@.12¾
Summer	"	.09¼@.09¾
Cylinder, dark steam ref	"	.08¾@.10¾
Dark, filtered	"	.11¼@.15¾
Light filtered	"	.14¾@.17¾
Extra cold test	"	.21¾@.26¼
Gasoline, 86°@90°	"	.14@.19
Naphtha, crude, 68°@72°	bbl.	9.05
"Stove"	gal.	.12
Linseed, domestic raw	"	.59@.60
Boiled	"	.62
Calcutta, raw	"	.85
Ozokerite	lb.	.11½
Paints and Colors—		
Chrome green, common	"	.05
Pure	"	.16
Yellow, common	"	.10¼
Best	"	.25
Lampblack, com'l	"	.04½
Refined	"	.07
Litharge, Am. powd	"	.05½@.05¾
English flake	"	.08¼@.08½
Glassmakers'	"	.07½

	Cust. Meas.	Price
Paints and Colors—		
Metallic, brown	sh. ton	$ 19.00
Red	"	16.00
Ocher, Am. common	"	9.25@10.00
Best	"	21.25@25.00
Dutch, washed	lb.	.04¾
French, washed	"	.01¼@.01⅞
Orange mineral, Am	"	.07¼@.07½
Foreign, as to make	"	.08@.10½
Paris green, pure, bulk	"	.12½
Red lead, American	"	.05¼@.05¾
Foreign	"	.06¾@.08½
Turpentine, spirits	gal.	.41½
White lead, Am., dry	lb.	.04¼@.04½
American, in oil	"	.05¼@.05¾
Foreign, in oil	"	.07¼@.09¼
Zinc, white, Am., ex dry	"	.04⅜@.04⅝
American, red seal	"	.06½
Green seal	"	.07
Foreign, red seal, dry	"	.07⅜@.08
Green seal, dry	"	.06⅜@.06½
Potash—		
Caustic, ordinary	"	.04⅞@.06
Elect. (90%)	"	.06½
Potassium—		
Bicarbonate cryst	"	.03¼
Powdered or gran	"	.14
Bichromate, Am	"	.08¼
Scotch	"	.08½@.09
Carbonate, hydrated	"	.04@.04½
Calcined	"	.03½@.03¾
Chromate	"	.35
Cyanide (98@99%)	"	.24@.25
Kainit	lg. ton	9.05
Manure salt, 20%	100 lbs.	.66
Double Manure salt, 48@53%	"	1.12
Muriate, 80@85%	"	1.83
95%	"	1.86
Permanganate	lb.	.03½@.10½
Prussiate, yellow	"	.13½@.13⅝
Red	"	.37@.37¼
Sulphate, 90%	100 lbs.	2.11
96%	"	2.14
Sylvinit	unit	.36½
Quartz—(See Silica).		
Salt—N. Y. com. fine	sh. ton	2.00
N. Y. agricultural	"	1.50
Saltpetre—Crude	100 lbs.	3.50@3.55
Refined	"	4.37½@4.62½
Silica—Best foreign	lg. ton	10.00@11.00
Ground quartz, ord	sh. ton	6.00@8.00
Best	"	12.00@13.00
Lump quartz	"	2.50@4.00
Glass sand	"	2.75
Silver—Chloride	oz.	.65
Nitrate	"	3⅛
Oxide	"	85.@1.10
Sodium—		
Bichromate	lb.	.06¼
Chlorate, com'l	"	.08¼@.08¾
Hyposulphite, Am	100 lbs.	1.60@1.65
German	"	1.70@1.90
Peroxide	lb.	.45
Phosphate	"	.02½
Prussiate	"	.10½@.11
Silicate, conc	"	.05
Com'l	"	.01
Sulphate, com'l	100 lb.	.77½
Sulphide	lb.	.01¼
Sulphite crystals	"	.02½
Sulphur—Roll	100 lbs.	1.85
Flour	"	1.90
Flowers, sublimed	"	2.15
Talc—N. C., 1st grade	sh. ton	13.75
N. Y., Fibrous, best	"	10.20
French, best	100 lbs.	1.25
Italian, best	"	1.62½
Tar—Regular	bbl.	1.95
Oil barrels	"	3.80
Tin—Crystals	lb.	.20@21½
Oxide	"	.42
Uranium—Oxide	"	2.25@3.00
Zinc—Metallic, ch. pure	"	.07@.07⅛
Carbonate	"	.15
Chloride	"	.05
Dust	"	.05¾@.05¾
Sulphate	"	.02⅛@.02¾

THE RARE EARTHS.

	Cust. Meas.	Price
Boron—Nitrate	lb.	$1.50
Calcium—Tungstate (Scheelite)	"	.90
Cerium—Nitrate	"	11.00
Didymium—Nitrate	"	35.00
Erbium—Nitrate	"	40.00
Glucinum—Nitrate	"	20.00
Lanthanum—Nitrate	"	30.00
Lithium—Nitrate	oz.	.60
Strontium—Nitrate	lb.	06¾@07
Thorium—Nitrate 49@50%	"	5.00
Uranium—Nitrate	oz.	.25
Yttrium—Nitrate	lb.	40.00
Zirconium—Nitrate	"	8.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable. See also Market Reviews.